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1936

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Trans-Atlantic

FIVE methods of flying across the Atlantic on a commercial basis have so far occurred to the minds of the world's inventors. These are (1) by flying-boat, using natural refuelling bases on the way, such as Iceland and Greenland, or the Azores and the Bermudas; (2) by flying-boat, using moored vessels, equipped with boarding aprons and catapults, as refuelling bases; (3) by the upper component of a composite aircraft; (4) by airship; and (5) by landplanes using seadromes moored at intervals. Two of these methods, Nos. (1) and (4), are the subjects of articles in this issue of *Flight*, the Short flying-boat and its accommodation being described on pages 258-260, and the new airship L.Z.129 (which is to be named the *Hindenburg*) on pages 246-250.

Three of these methods have so far been tried out in actual practice. Air France has for some time past been sending flying-boats across the South Atlantic, the *Graf Zeppelin* has been plying regularly for years past over the same route, and the Germans have also been using flying-boats in conjunction with refuelling ships on the route to South America. The composite aircraft method will, it is hoped, be tried out in the near future; but as yet no seadrome has been moored in the Atlantic, and no flying company has formed plans which include its use.

Each method needs careful study from the point of view of the traffic which it is likely to attract, and the chance it has of paying its way, either on its own merits or at least with only a moderate Government subsidy. It should be noted that so far the German seaplanes, which are catapulted off the refuelling ships, carry only mails and that the Mayo composite craft is also intended to carry only mails. The Zeppelin service caters for passengers; and the French, the British and the American seaplane services either do, or intend to do, the same. If a seadrome service is ever put into operation it will also hope to carry passengers.

For a purely mail service the great desideratum is speed, modified by the desirability of landing to refuel and so to avoid having to sacrifice payload for fuel. In the case of passenger services, a compromise has to be struck between speed and comfort, which are to some extent conflicting qualities. The prospects of the Mayo composite system ought not to be judged entirely on the first experiments, as they must necessarily be concerned chiefly with establishing the soundness of the main principle. Once that principle is established, as there is every hope that it will be, it is easy to imagine the upper component as a very fast landplane with retractable wheels, which would be quite able to land on shore when its fuel had mostly been consumed. The initial expenses of such a service would be increased if a launching boat had to be stationed at the Azores and another at the Bermudas, but without them the weight of fuel would seriously reduce the payload. Despite this, such a service, once really high speed had been attained, ought to attract any quantity of first-class mail matter and so prove profitable. Once the services per diem were duplicated and then further multiplied, the overhead cost of the launching boats *en route* would be reduced, and dividends should increase.

The Craving for Comfort

It is less easy to estimate the prospects of the German service, which depends on catapult ships moored out at sea. Figures of cost are not available. Theoretically the Mayo craft has greater chances of attaining high speed than a flying-boat can have. If the Germans decide to carry passengers on such a service, the effect which the catapulting might have on the bookings would have to be calculated. If a long run and gentle acceleration can be provided for the catapults, the disagreeable sensations should be slight; but it can be imagined that if one old lady was not careful to keep her head firmly back against the cushion and got a crick in her neck as a consequence, the result might be a serious falling off in bookings. Passengers who can pay for air transport (apart from those who look on it as an adventure

and the occasional business man in a hurry) are apt to resent any unpleasantness of that sort.

When one comes to consider the craft which definitely want to attract passengers, namely, the flying-boats using natural bases for refuelling, and the airships, it is only fair to take into consideration also the latest surface liners, the *Normandie* and the *Queen Mary*. So we get three different compromises between speed and comfort. The Short flying-boats offer a degree of comfort never before contemplated in an aeroplane, and they will cruise at about 155 m.p.h. That is a very attractive proposition for a passenger. The *Hindenburg* will cruise at only 78 m.p.h., but, naturally, with the large space available it can offer comforts and luxuries on a scale which it would be idle to pretend that flying-boats can at present attempt to rival. Finally, there are the big liners, which can cross the Atlantic in about 100 hours, and can offer comfort and luxury far ahead of the airship. Passengers will have to choose which they prefer.

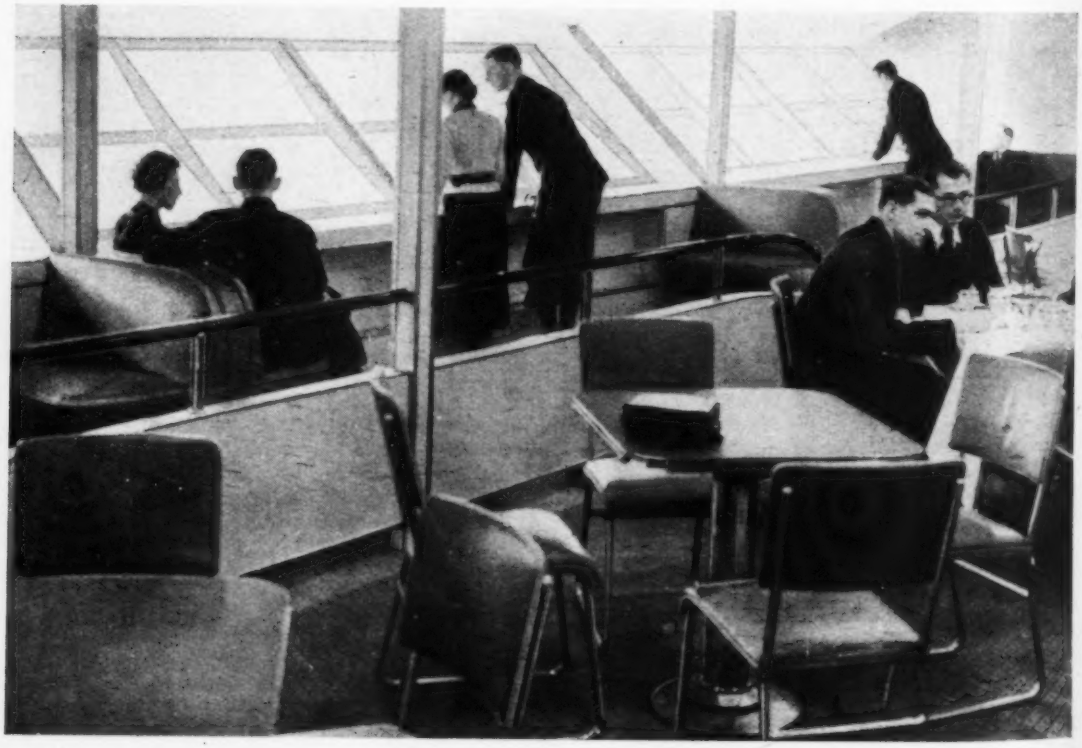
One thing may be taken as certain: the taste for air travel is on the increase; the mere fact of flying, of being up aloft, will incline more and more passengers as the years go on to prefer aircraft to seacraft. Also, we may prophesy that flying-boats will grow larger and still more comfortable, as well as faster. The airship has already found her ideal streamline shape, and can hardly increase her speed materially except by using more powerful engines. Still, airships may also grow larger, and so be able to add to their luxuries. The competition will be interesting to follow, but it should be borne in mind that even if the airship is ousted from the passenger business, its place as a naval scout still needs careful consideration.

A Further Increase

FOR the third time within the last two years the Government has announced an increase of the Royal Air Force, this time in conjunction with increases of the Navy, the regular Army and the Territorial Army. Details of the air increase are given on page 266. The last programme contemplated 123 squadrons in this country with about 1,500 aircraft. The new plan aims at a total of 1,750 first-line aircraft in this country, exclusive of the Fleet Air Arm. That means twenty or twenty-one new squadrons, according to the proportion of single-engined squadrons (with twelve machines) and multi-engined squadrons (with ten machines) in the programme. In addition, there are to be twelve new squadrons for overseas—or, as the White Paper puts it, the equivalent of twelve squadrons. These thirty-two or thirty-three squadrons are independent of the Fleet Air Arm, which is to be raised to "substantially higher figures" of first-line aircraft in the next few years. The time limit of this programme is not given.

The Home increase is not all for air defence. Six of the new squadrons (two Regular and four Auxiliary) are for work with the Regular and Territorial Armies, and this increase has certainly not come too soon.

But, as the White Paper says: "The prime function of the Royal Air Force is to provide an effective deterrent to any attack upon the vital interests of this country, whether situated at home or overseas." That sentence lays down decisively, and for the first time, the place of the Air Force in our defence scheme.



LUXURY ABOVE THE ATLANTIC: Part of the hotel-like lounge of the new Zeppelin, *Hindenburg*. Even the crew's quarters are more luxurious than those of the passengers in the *Graf Zeppelin*. The airship (some remarkable *Flight* drawings of which appear on pages 246-250) is due to make her first test flights in a few days' time.

The Outlook

A Running Commentary on Air Topics

Army Aircraft

NOT the least welcome part of the new expansion of the R.A.F., which has been announced by the Government, is the provision of two more squadrons for army co-operation work. At present there are five A.C. squadrons, Nos. 2, 4, 13, 16 and 26, one for each division of the Expeditionary Force of the Army. In war that would be a very scanty supply, and, moreover, in war there ought to be one squadron working under the headquarters of each Army Corps. For that there is at present no provision at all. How a squadron of twelve machines could carry out all the reconnaissance required by an Army division, and also keep itself up to strength, is a question which belongs to the region of pious hopes rather than of probabilities.

Four of these squadrons are stationed in the South, two at Old Sarum, one at South Farnborough, and one at Hawkinge. Up in Yorkshire No. 26 (A.C.) Squadron lives by itself, and does all the air work for the Northern Command (one regular division and two Territorial divisions), the North Midland Division, T.A., and the Scottish Command (about one Regular division and two T.A. divisions). The position is almost ridiculous, and consequently the raising of two more Army co-operation squadrons is a very welcome increase.

A New Departure

THE one really novel feature of the expansion scheme is the proposal to raise four squadrons of the Auxiliary Air Force to work with the Territorial Army. That should, for one thing, take quite a lot of burden off the shoulders of No. 26 (A.C.) Squadron. The novelty of the move lies in giving this sort of work to Auxiliary units. When first the A.A.F. was started all the squadrons were equipped with light bombers. Then the three Auxiliary squadrons in the London area were converted into two-seater fighter squadrons. Now the A.A.F. is to have four army co-operation squadrons.

Equally with the work of the Fleet Air Arm and of the flying-boat squadrons, the work of army co-operation requires careful and intensive training of a specialist kind. The pilot of an A.C. machine has to fly as automatically as he walks. His whole attention has to be concentrated on his reconnaissance, and he can only reconnoitre satisfactorily when he has been highly trained in the business. He has to go through a course at the School of Army Co-operation at Old Sarum, during which he has to soak himself in Army tactics until he is almost qualified to wear red tabs and a red band round his cap. It is an exacting course for a regular R.A.F. officer, and now Auxiliary A.F. officers will have to undertake it. If one can judge by the excellence of their work in other directions it is safe to prophesy that they will do even this work very well.

Industry and Defence

ONE very important phase of the new defence scheme is that of industry in its relations with arms production. The Government's White Paper calls attention to the need for wholehearted co-operation by industry and labour, and the Prime Minister has more than once affirmed the determination of the Government to see that there is no profiteering. The two things are not, perhaps, altogether incompatible, but there is no use in denying that there are difficulties.

It is possible to argue that if a worker in an aircraft factory is enabled to make £4 per week where previously he could only earn £3, he is virtually profiting by abnormal conditions. Yet few would call that profiteering. The manufacturing firms, on the other hand, are subject to the very strictest supervision, and there is not even any certainty that they will make any profit at all. That may be difficult for some people to believe, but bankers are hard-headed business folk, and a story is being told which throws an interesting side light on the subject.

A certain well-known aircraft firm, the story goes, had in hand orders to a value exceeding a million sterling. Being short of ready capital for the purchase of raw materials and so forth, the firm approached its bank with a view to arranging an overdraft of about a quarter of a million. In view of the large orders on hand, the local bank thought this could be arranged, but decided to submit the matter to the London head office. After scrutinising the Air Ministry orders, the London bank pointed out that no price per aircraft had been agreed upon, and that the constructor was not to be permitted to make a profit in excess of a certain relatively small maximum percentage. It pointed out that it might very well turn out that when the price per aircraft was actually agreed upon, the contractor would find he had made a loss instead of a profit. In the circumstances the bank agreed to an overdraft of £50,000 instead of the quarter of a million which the constructor asked for.

The story may or may not be true, but it does illustrate very well that being full up with orders does not necessarily mean prosperity.

Belts or No ?

RETURNING from Switzerland in a Swissair Douglas last week-end a member of the staff of *Flight* had an experience from which several morals might be drawn. The D.C.2 in which he was a passenger, taking off from Zurich Airport in a heavy snowstorm, came down again outside the aerodrome boundary, and eventually came to rest, in a considerably crumpled condition, among some trees. The exact cause is at present uncertain.

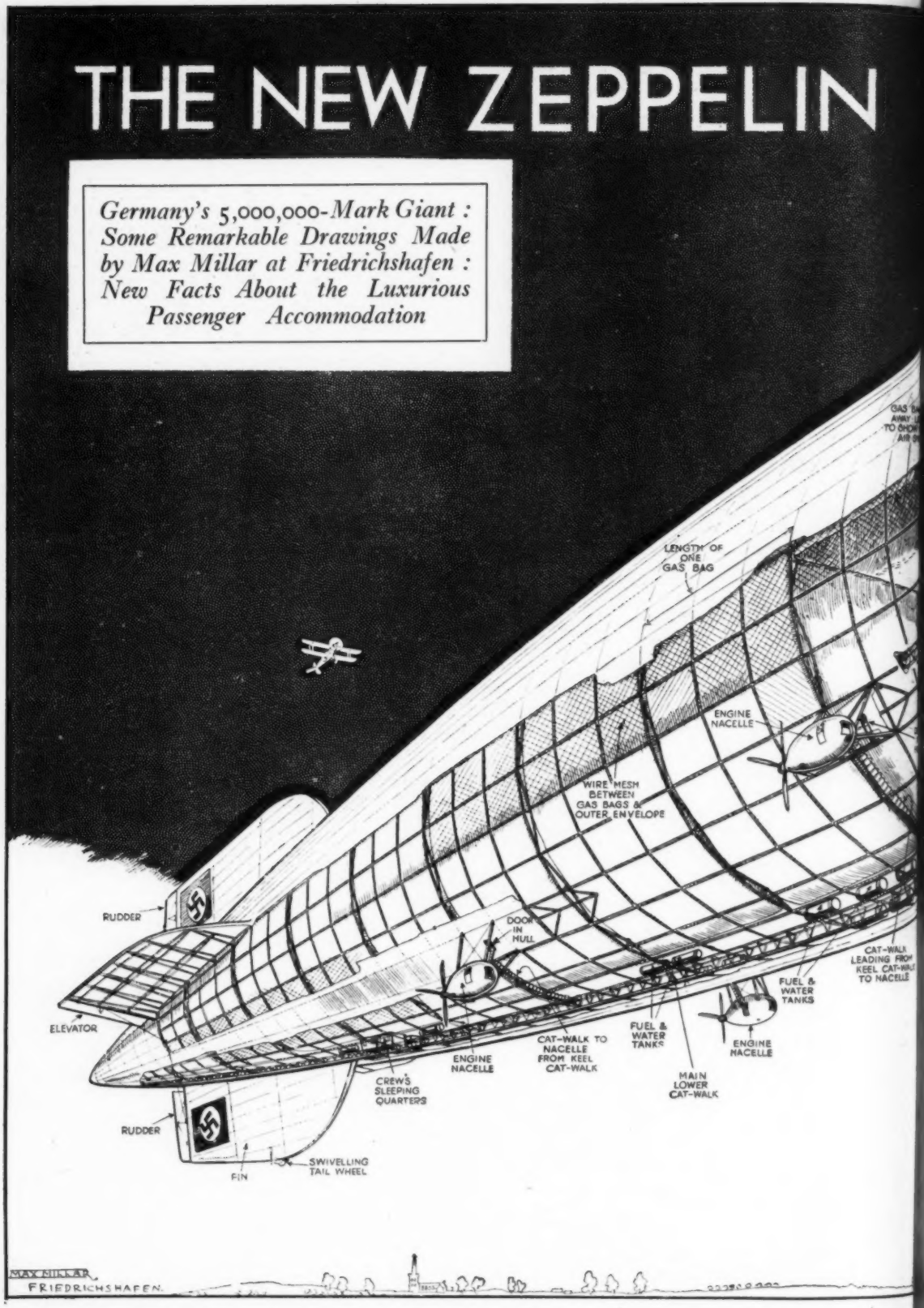
The point which interested our colleague, however, was whether the jumbling-up of the passengers which resulted might not have been avoided had they been made to fasten the safety belts with which the seats were equipped. The desirability of providing safety belts in air liners admits of much discussion. Of their utility in preventing cuts and bruises and general panic resulting from passengers being thrown in a struggling mass in the forward part of the cabin in the event of a crash there is no doubt. But this advantage is possibly offset by the misgivings which their appearance would inevitably arouse in the minds of nervous or unpractised passengers. One can imagine the proverbial dear old lady, on finding safety belts in *Heracles*, wondering if Capt. Jones was liable to loop the loop over mid-Channel. Yet belts are found as a standard fitting on some Continental and many American air lines, where, in the latter case, they are a great help to passengers in the bumpy conditions sometimes experienced in certain districts.

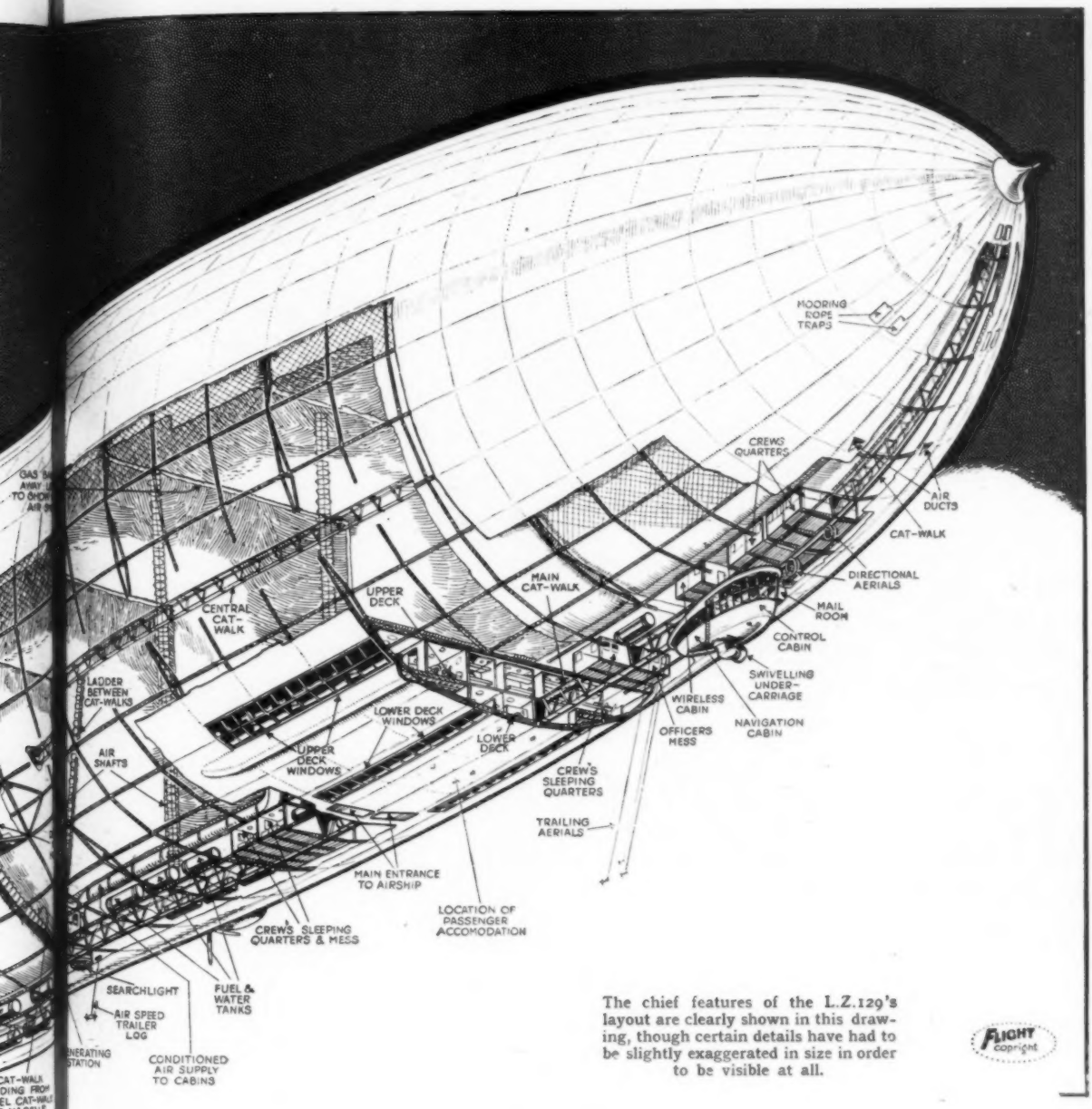
A bright spot in our colleague's experience at Zurich, incidentally, was the cool-headedness of the D.C.2's stewardess, Fräulein Heidi Oberholzer, well known at Croydon, who quickly sorted herself out from the struggling humanity, climbed up along the cabin and opened the door.

A

THE NEW ZEPPELIN

Germany's 5,000,000-Mark Giant : Some Remarkable Drawings Made by Max Millar at Friedrichshafen : New Facts About the Luxurious Passenger Accommodation



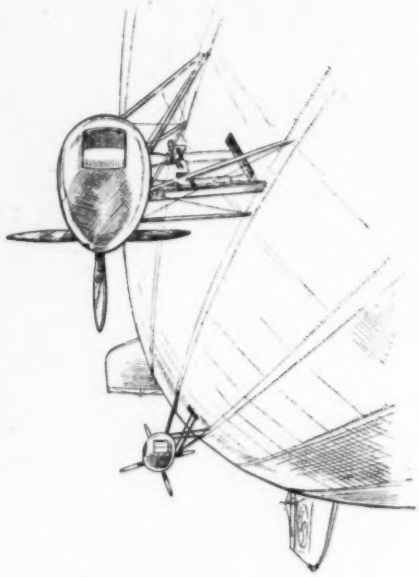


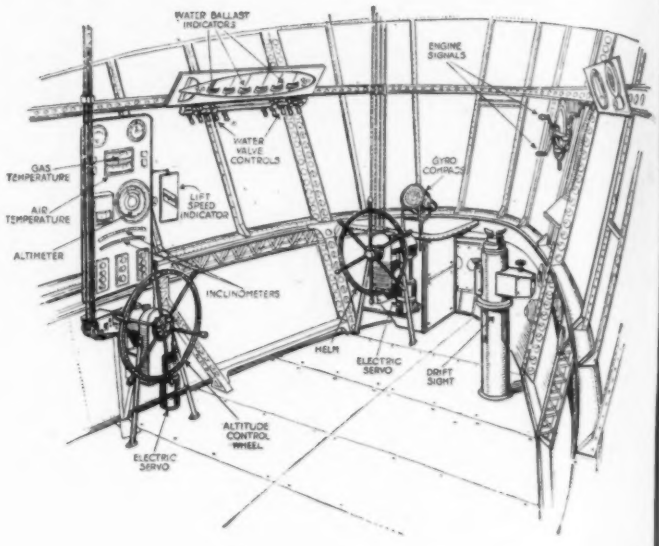
The chief features of the L.Z.129's layout are clearly shown in this drawing, though certain details have had to be slightly exaggerated in size in order to be visible at all.

THE latest Zeppelin airship, bearing the works number L.Z.129, and later to be christened the *Hindenburg*, is now all but complete in the huge shed at Friedrichshafen, on Lake Constance, and its sixteen gas bags are in process of being filled with hydrogen from the Zeppelin Company's own plant. As soon as the filling has been completed, which will probably be in a week or ten days, it is likely that the new airship will make her first flight. At the invitation of the Zeppelin Company, *Flight* visited the works at Friedrichshafen last week, and was shown the details of the airship. The sketches by Max A. Millar and the photographs used to illustrate other features of the airship are a result of this visit, and it is with considerable gratification that *Flight* is able to place before its readers the first instalment of an illustrated description of the L.Z.129. A description of certain aspects of the constructional work were given in an article in the issue of October 3, 1935.

Into the design and construction of the new airship has gone all the experience which the Zeppelin Company has accumulated during a period of thirty-five years of unbroken activity in airship work. In view of the great success of the *Graf Zeppelin*, with a record of 13,358 flying hours during which that amazing airship has covered a distance of considerably more than 800,000 miles and has carried 12,000 passengers without a single serious mishap during a total of 505 flights, one may

INSIDE THE L.Z.129





(Left) : How the flight engineers reach each of the four 1,000 h.p. Mercedes-Benz oil engines, after ascending inside the structure (as shown in the big drawing on the previous page) from the keel cat-walk. (Centre) : This sketch of the control cabin shows the instrument layout. In addition to the chief officer and navigating officers, the complement of the cabin includes a man stationed at the helm and another at the altitude control wheel. (Right) : These two diagrams clearly illustrate the layout of the passenger accommodation, the lower one revealing the arrangement of the lower deck.

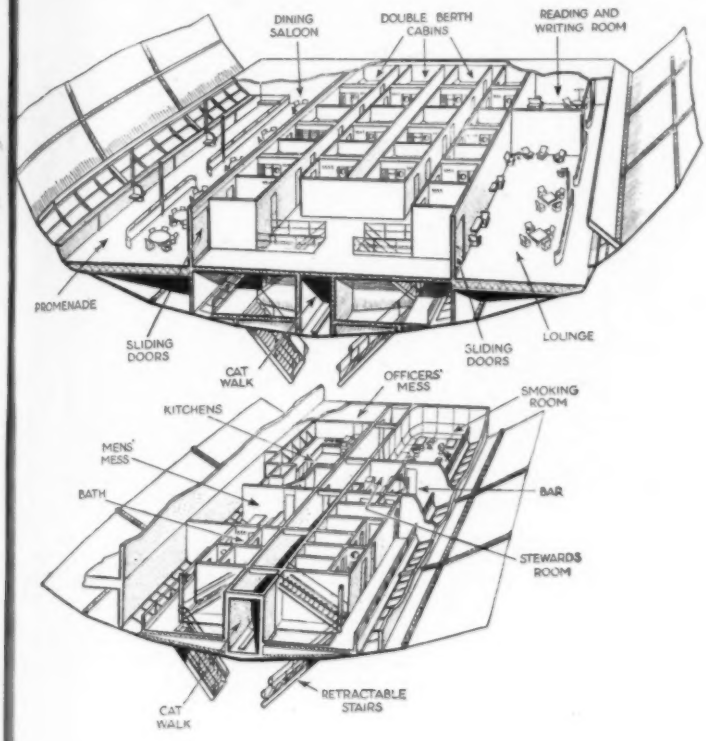
be permitted to be optimistic concerning the technical success of the L.Z.129. Time alone can prove the economic success of the new airship, which has, it is reported, been built at a cost of five million marks, and which will have to carry a good many passengers and many tons of mails and freight across the Atlantic in order to show a profit on the capital invested. Doubtless the Deutsche Zeppelin-Reederei has gone into the figures very thoroughly and as a result has come to the conclusion that operation of the airship can be made to pay.

At the end of this month, the regular airship service to South America will begin, and will be run fortnightly in each direction until October, when a weekly service will be started. The new airship will make the trip as and when opportunity occurs, and will also make experimental flights to New York (Lakehurst), where a mooring mast is available. The fare from the new Zeppelin airship harbour at Frankfurt to Lakehurst, New Jersey, will be 1,000 marks, and the first flight is scheduled for May 6, 1936.

It may be pointed out that while the *Graf Zeppelin* was designed for research and experiment, and was not originally intended for trans-oceanic work, the L.Z.129 is the first airship to be designed specifically with such flights in view. That she should be well able to cover non-stop any ocean stages likely to be encountered will be realised when it is pointed out that her maximum range is 8,700 miles. Some idea of her commercial possibilities may be formed from the fact that her payload is no less than 42,000 lb. Of this it is estimated that the 50 passengers and the food they will consume during a journey will account for 15,432 lb., leaving 26,455 lb. for mails and freight.

Power for the airship is provided by four Mercedes-Benz diesel engines developing a total aggregate of 4,400 b.h.p. The engines are of the sixteen-cylinder water-cooled vee type (not, actually, of the twelve-cylinder O.F.2 type

The new Zeppelin really does approach the usually exaggerated "flying hotel" analogy—even to a writing and reading room.



described in *Flight* a few weeks ago), with a very small angle between the cylinder blocks. The engines have a bore of 175 mm. and a stroke of 230 mm., and overhead camshafts operate four valves in each cylinder. The engines run at 1,400 r.p.m. and a 2 : 1 reduction gear gives an airscrew speed of 700 r.p.m. Four-bladed wooden airscrews are fitted.

The L.Z.129 has an overall length of 813ft., a maximum height of 146ft. 8in., and a maximum diameter of 135ft. 2in. The gas capacity is 7,062,951 cu. ft. maximum and 6,709,804 cu. ft. normal. The gross lift is estimated at 471,788 lb., which corresponds to a lift of 67.5 lb. per 1,000 cu. ft. of hydrogen, based upon a capacity of seven million cu. ft. in round figures. The calculated maximum speed is 84 m.p.h., and the cruising speed 78 m.p.h. With all fuel tanks full, the weight of fuel oil carried is 143,300 lb. In addition to the 50 passengers, the L.Z.129 will carry a crew of 40.

In the layout of the passenger accommodation several innovation are to be found. Instead of the various salons and cabins with a total accommodation for twenty-four passengers, the new airship has the accommodation arranged on two decks, of which the upper or "A" deck is the larger and contains on one side the large dining room and on the other the lounge and reading and writing room. In the centre of this deck are situated the twenty-five bedrooms, each containing two berths, cupboards, wash basin and chairs.

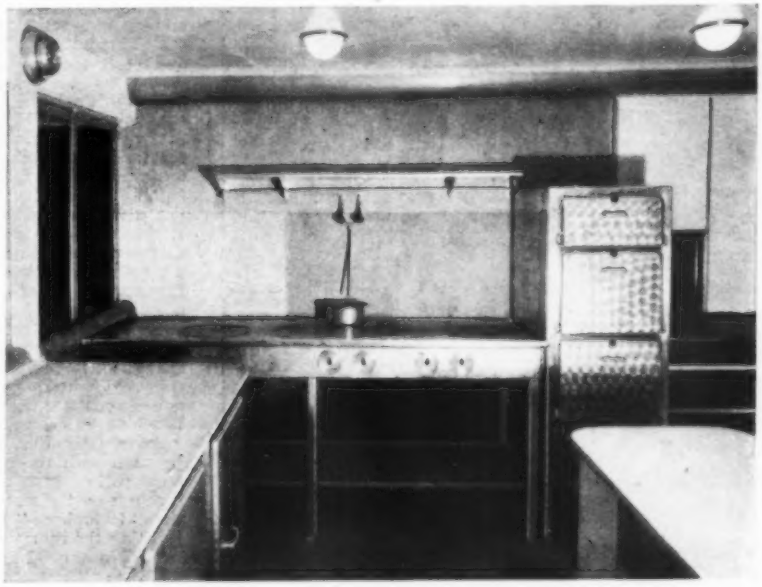
On the lower, or "B" deck, are the ship's office, the kitchen, the shower bath, the lavatories and the smoking room. The last-named is an innovation on an airship and has been made possible by making it airtight and so entirely separated from any other part of the airship in which there might be faint traces of hydrogen. The door to the smoking room is, of course, airtight, and the passengers can open it only to enter the smoking room. When they wish to leave it is necessary to get a steward to open it for them. This precaution has been taken to avoid the chance of an absent-minded passenger walking out of the smoking room with a lighted cigarette in his hand! Inside the smoking room itself, every care is taken to avoid any possible fire risk. The walls are covered with leather and not fabric, and the ash trays are so arranged that when a cigarette stump is dropped into them they automatically close and cause the cigarette to go out.

Rooms with a View

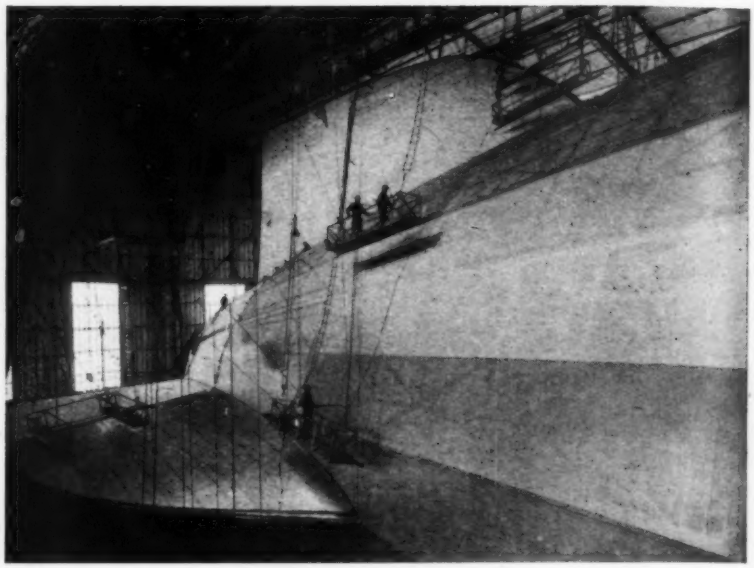
All the day rooms in the airship are provided with very large sloping windows through which a very fine view of the surrounding scenery is obtained. To enable passengers to get close to the windows on the upper deck, the floor beams have been extended beyond the sides of the hull, the structure being, of course, enclosed in a bulge or "blister."

In the kitchen all cooking, heating and cooling is done by electricity, the current for which, and for lighting and ventilating the airship, is produced by two 50 h.p. diesel engines situated in the generating room amidships, which is entirely separated from the rest of the hull by airtight walls and ceiling. From the kitchen a lift runs to the sideboard in the dining room, and for the use of stewards there are narrow ladders connecting the kitchen and dining room.

Crew's quarters are located on each side of the lower "cat walk" towards the bows, but separate messes for



Part of the galley, with cooking and refrigeration by electricity.



A vivid idea of the size of the fins is given by the sight of men applying finishing touches to the fabric.

officers and ratings are located on "B" deck. As in the *Graf Zeppelin*, the control car is situated forward and external to the main hull, so as to afford the best possible view. Aft of the control cabin, and communicating with it, are the navigator's quarters, with large tables on which to spread the charts and plot off courses. Above the control cabin is the wireless operator's compartment.

The suspension of the engine cars in the *Graf Zeppelin* on struts was found satisfactory, and a similar arrangement is used in the L.Z.129. Access to the cars from the hull is via the corresponding ring frames from the central "cat-walk." The engines are driving pusher airscrews, so that the engine nacelles are mounted with their pointed ends facing aft. In the nose of each nacelle is a radiator, which can be more or less covered with a sliding door in order to vary the cooling to suit different conditions of temperature and weather. Fuel is carried in a series of cylindrical tanks ranged on each side of the lower "cat-walk," but lubricating oil is carried in tanks placed inside the walls of the hull, close to the engines.

An unusual feature of the L.Z.129 is the use of undercarriages. One of these is fitted under the control car forward, while the other supports the edge of the lower tail fin. The wheels are arranged to swivel laterally, and are sprung by mounting their framework on compressed air cylinders. Those who were fortunate enough to see the *Graf Zeppelin* brought into Hanworth aerodrome some years ago will remember the superb skill with which the airship was handled. The wheel undercarriages should facilitate ground handling when that has to be resorted to. There is, of course, a fitting in the extreme bows for mooring the airship to a mast, such as that available at Lakehurst.

On completion, the L.Z.129 will be handed over to the Deutsche Zeppelin-Reederei for trans-oceanic operation, and a new airship, the L.Z.130, will be put in hand at once. It is also reported that a second, and somewhat smaller, airship is being planned—possibly intended for high-speed mail work.

Next week some of the many interesting constructional features of the L.Z.129 will be described.

One of the two-berth cabins, fully equipped with hot and cold water wash-basin, well lighted, and cosily and tastefully decorated.

SOUNDING FOR SOUNDS

AS every engineer knows, one of the most elementary and certain methods of detecting trouble in machinery is to take note of the sound which it emits; very seldom can anything go wrong with any type of mechanism without some distinctive noise giving evidence of the fact.

Not always, however, are these noises loud enough to be audible above the sound of the rest of the machinery, and some, indeed, may be of a "microscopic" nature quite inaudible to the unassisted human ear.

It is for the accurate detection of such noises that the "Capac Bin-Aural" testing equipment has been evolved by the Capac Co., Ltd., 26, Brookwood Avenue, Barnes, London, S.W.13, and it is now being utilised very widely in factories, repair shops, and experimental departments. The Bristol Company, Napiers, Wolseleys, Armstrong Siddeleys, S. Smith and Sons, and the Admiralty Engineering Laboratory are, it is stated, among the users. Although rather resembling a stethoscope in appearance, the apparatus is far less rudimentary than that simple medical instrument, and the very slightest sounds occurring in any machinery to which the contact point or "test rod" is applied are greatly magnified.

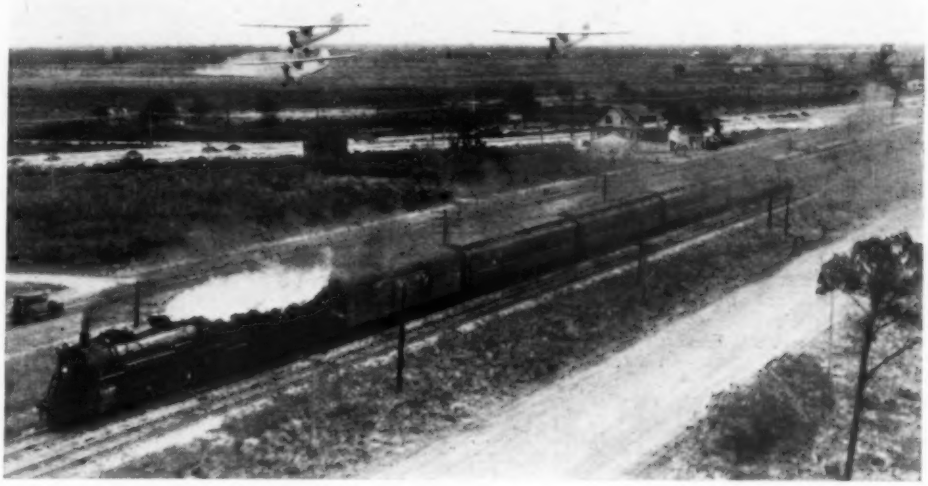
Perhaps the most interesting aspect, however, is the fact that the "tectoscope," as the test-rod part of the apparatus is termed, is supplemented by an alternative type of receiver called a "tectophone," which can be used for picking up noises such as those emitted by worn teeth of gear wheels, to which, of course, the test rod cannot be applied.

Apart from this, two "tectoscopes" can be used in conjunction with the same pair of earphones in order to secure a comparison between the noises emitted by, say, two different bearings on the same shaft, or, again, the "tectoscope" and the "tectophone" can be used in conjunction for accurately isolating the source of one sound from the source of another.

Sold in a polished oak case containing two "tectoscopes" and one "tectophone," with complete sets of connecting tubes, joints, and test rods, the equipment costs £6 15s.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS



AIR, RAIL AND ROAD: Three privately owned Aeroncas (36 h.p. cabin two-seaters of the kind in which F/O. Llewellyn has reached Johannesburg from London) "shoot-up" the Florida Special, one of the world's fastest long-distance trains, as it nears Miami on its 5,000th trip over the Florida East Coast Railway. Readers may, or may not, be interested to learn that the train has "a hostess, orchestra, full-sized recreation car and accommodations for dancing, bridge and entertainment."

TOMMY" ROSE left the Cape on his return flight to England at 8 a.m. G.M.T. last Tuesday.

After a conference on Tuesday it emed likely that the strike at the De avilland works would end to-day.

The municipality of Nice is shortly to rovide an aeroplane for forest fire patrol ork on the French Riviera.

Captain G. Verhaegen, an outstandgly brilliant officer of the Belgian Air rce, has been killed in a crash.

It is likely that a large proportion Italy's new squadrons will receive e Savoia Marchetti S.81 threegined bomber.

Official tests will be made at Hendon xt Tuesday to determine if a gong or n is the more penetrating as a means warning against gas.

Brigadier-General Oscar Westover has en appointed chief of Air Corps, U.S. my, with Brigadier-General Henry H. nold as second in command.

The Russians are now experimenting th liquid-fuel stratosphere-sounding ckets carrying instruments and uipped with parachutes to secure safe scent.

Towing five gliders, it is reported, a viet P.5 aeroplane reached a height of 300 ft. and then cast them off, their ts all reaching an aerodrome at which lly was in progress.

To commemorate the flight of General illemin into Africa a beacon is to be cted at "Petrol Station Five" in the ddle of the Sahara. Six supmentary lights will be provided along e desert route.

A Very Famous Canadian

Lt. Col. W. A. Bishop, V.C., the famous war pilot, has been elected honorary patron of the Canadian Flying Clubs Association, which represents the twenty-two Canadian clubs. Lt. Col. Bishop still flies—as an enthusiastic private pilot.

Italy Enlists Lady Luck

The Italians have developed a novel form of attack against warships. A torpedo, adjusted to follow a circular course in the water at 50 knots, is dropped by parachute in an enemy harbour or anchorage. They feel that it might hit something or other.

Portugal Stronger Soon

Six Blackburn Shark bomber-reconnaissance seaplanes are undergoing acceptance trials at Brough this week before a mission from the Portuguese Naval Air Service. They are fitted with 760 h.p. Siddeley Tiger engines and, equipped for reconnaissance, are capable of 150 m.p.h.

Twenty-five Years Ago

(From *Flight* of March 4, 1911.)

"In the course of the subsequent discussion Col. F. Stone, R.A., said that the effect of explosives from aeroplanes and balloons had been extremely disappointing to the most sanguine supporters of this method of warfare . . . He had very little faith in anything like successful practice from the air upon enemies upon the earth . . . He deprecated the hysterical views as to dirigibles laying towns in waste and playing havoc with the civilised organisation."

About the Size of It?

F/O. David Llewellyn, who, flying an Aeronca, left London for the Cape on February 7, reached Johannesburg on Sunday, after spending two days in the bush earlier in the week. It is to be suspected that the newspaper stories of his "reducing oversized pistons with a nail file" originated from a telegraphic message about *seized* pistons.

The Diesel's Future

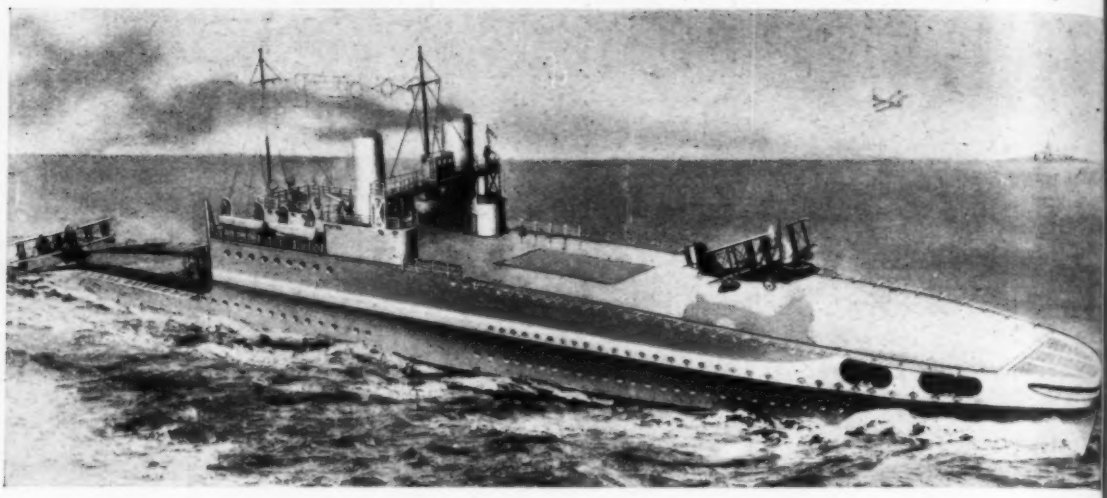
"The petrol engine, by reason of its vastly superior power-weight ratio, has a long start, and has recently improved on its handicap; but the Diesel engine is still very much in the race, and for civil and commercial requirements it has, we believe, a definite future."—Sir Harold Snagge (chairman) at the Napier general meeting.

Belgian Aeroplane Imports

An official return, lately to hand, shows that, converting Belgian francs at 143½ to the £, complete aeroplanes valued at £83,004—mainly, presumably, the Savoia S.73s for Sabena—were last year imported into Belgium, as compared with only £1,721 in 1934. Of the total Italy is credited with £58,320 and Gt. Britain with £21,045.

British Components for Belgium

There was a corresponding increase during the same period in the Belgium imports of aeroplane parts — from £32,516 to £37,226, of which latter total the United Kingdom is credited with £27,882 and France with £8,774.



The original conception—the Thornycroft carrier with a stern ramp to receive amphibians and a flying-off deck to despatch them. An amended design (see page 253) makes use of catapults.

SPEEDING-UP the AIRCRAFT CARRIER

Revolutionary Thornycroft Design for High Speed and Manœuvrability : Seaplanes Launched by Catapult and Retrieved on Hein Landing Apron

CONSIDERABLE interest has been aroused by the news that John I. Thornycroft and Co., Ltd., have designed a new "vest pocket" aircraft carrier intended for extreme mobility, manœuvrability, and cheapness in operation. *Flight* is privileged to give a detailed description of the proposed layout, a feature of which is the employment of the Hein landing apron or "canvas," similar to that employed on the mother ships of the D.L.H. South Atlantic service.

Shown in the heading drawing is the original conception—a carrier sending off amphibians from a flying deck forward and picking them up on a runway aft. The scheme has since been amended to that shown in the diagram on page 253—a ship having the same general layout, but picking-up its craft on a Hein canvas and equipped with catapult launching gear in place of a flying-off deck; the carrier would then house floatplanes, flying boats or amphibians.

Gentle Catapulting

The catapults will be able to deal with aircraft of up to 8,000 lb. weight, catapulting them at a speed of about 57 m.p.h. The catapults are sufficiently long to permit comparatively gentle acceleration, thus making it safe (which is not always the case) for aircraft loaded with bombs. Also, by reason of the forward disposition of the catapult, the take-off is further enhanced by the speed of the ship and, incidentally, the necessity of having a rotating type of catapult for launching into the wind is eliminated.

This means a considerable saving in time in the discharging operation, as aircraft may be catapulted over the bow at a very fast rate when the ship is travelling at full speed, irrespective of direction of wind.

The use of the Hein canvas allows the carrier to maintain speed throughout the picking-up operation, thus rendering it far less vulnerable to torpedo attack by submarine. Another advantage which perhaps is not at first so obvious is that, while resting on the canvas at the stern, an aircraft may readily be refuelled and provided with ammunition.

The propulsive machinery consists of twin-screw single reduction gear turbines, steam being supplied by oil-fired Thornycroft water-tube boilers.

The anti-aircraft armament consists of a battery of four pom-poms, while, as protection against surface craft, the carrier is provided with three 5in. guns. The type and character of the armament is, of course, optional, but the main protection of this type of carrier should be in its speed and good manœuvri powers.

Special attention has been paid to the latter point, and tw rudders of large area have been provided. These, in conjun tion with the long cut-ups forward and aft, assure very exce tional handiness on the helm.

The ship is approximately 360ft. in length, with a displac ment of about 3,000 tons and an estimated speed of 28 knot if thought desirable, a greater speed could be obtained by t use of more powerful machinery.

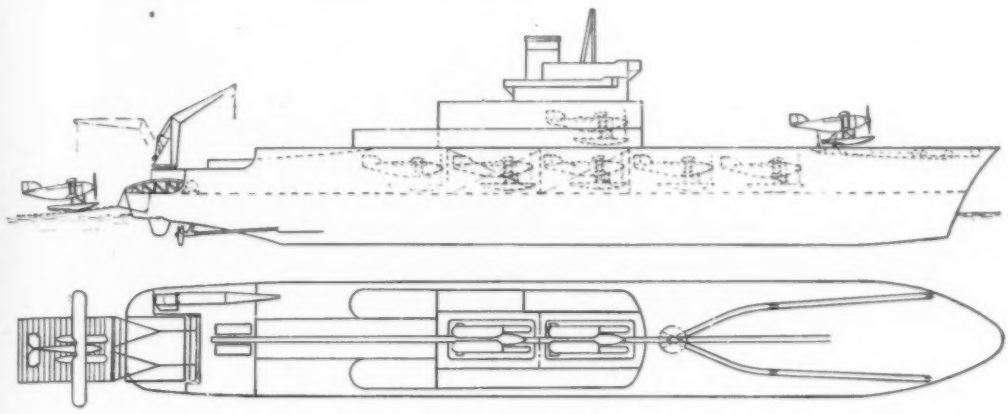
Turning to details of the principal features, there is co siderable interest in the construction of the Hein landi canvas. The efficiency of the arrangement depends on t fact that the canvas acts in somewhat the same way as hydroplane. There is thus much less resistance to towing th might appear probable.

The canvas, when not in use, is wound up on an apron win drum in the stern of the aircraft carrier. When it is desire that an aeroplane should land on the canvas, the latter is pa out from the drum on to the sea over a platform provided the stern. To facilitate this manœuvre, two small sea-anchor are attached to the rear end of the canvas.

Details of the Canvas

The canvas is made of sailcloth and, so that it may be co veniently wound up on the drum, it has no longitudinal stiffe ing. In order to protect the canvas at the moment of landing the lower part is provided with transverse boards of Orego pine, and with mats. To smooth out the water and also th screw stream behind the canvas, and to prevent lateral lurch ing, the canvas is provided with a number of guide surface on the underside of its lower end. These surfaces consist vertical or downwardly directed longitudinal fins of sail-cloth The lower edges of the vertical fins are connected by a hor zontal fin parallel with the canvas, so that longitudina channels are formed through which water currents can pass.

The canvas terminates at its forward end in two "tops" which are connected main wire ropes that lead to the apro winch drum, and by means of which the apron can be paid o and afterwards drawn inboard. When the canvas is paid o and the tops come under water the whole canvas becomes sub merged ready to receive the aircraft. Also connected to t tops of the canvas are auxiliary wire ropes that are led und two guide pulleys, journaled to opposite sides of the carrie near to the sea level, and then led inboard. By drawing in th main wire ropes the canvas with an aeroplane thereon can b



The amended design for the Thornycroft carrier, with a Hein landing apron towed astern and catapults on the bow. The flying craft would be floatplanes.

drawn near to the stern of the carrier, and by simultaneously drawing in the auxiliary wire ropes, the front end portion of the canvas will be kept low down so that the aeroplane will not slip backwards when near to the stern of the carrier. The inner ends of the auxiliary wire ropes are finally fixed to the carrier.

Near the stern of the Thornycroft carrier is a relatively short "reception deck" or platform arranged at a lower level than the upper deck, with a rearwardly and downwardly extending guiding and supporting device, arranged at a lower level than the reception deck; over this device can be hauled, by a winch, the ropes attached to the Hein canvas.

Trolley Arrangements

Mounted on the lower reception deck and at one side of the stern portion of the carrier is a crane to lift the aeroplane from the canvas and place it on a catapulting trolley on the reception deck ready for transference along the upper deck, either direct to a catapult or, by a lift, to the storage hangar on the lower deck. The reception deck is provided with a "table" made in two sections, capable of being raised and lowered independently of one another, to receive the two floats of a seaplane. The construction of this table is such as to enable a catapulting trolley to be brought into position over the reception deck to receive an aeroplane placed on the table. This operation, state the designers, should be speedy and easy, even in a moderate sea.

The upper deck of the carrier is connected with the lower by one or more lifts of the cage type having upper and lower platforms, so that both decks are complete when the lifts are down.

The forward or bow portion of the upper deck is provided with one or more catapults and fitted with a longitudinal track which extends rearwardly over one or each of the upper platforms of the lifts. The catapult trolleys are adapted to travel on the track and to carry the machines to the catapults for launching. Each aeroplane when on the carrier is normally resting on a catapulting trolley.

A turntable is provided on the forward position of the upper deck so that a trolley carrying an aeroplane can be delivered to a catapult, "returned empty" to the turntable, and moved out of the way on to a central spare track.

General Advantages

The designers feel that the proposed new craft's speed capabilities (though it must be assumed that they visualise more powerful engines than those specified, for the 28 knots quoted is a lower figure than that of some existing carriers) combined with its manœuvring qualities and its independence of the direction of the wind as regards flying will enable her to keep touch with a fleet in circumstances which might be very difficult for the conventional type of aircraft carrier.

Principal data are as follows:—

Length between perpendiculars	360 ft.
Breadth moulded	52 ft.
Mean draft	13 ft.
Standard displacement (about)	5,000 tons.
Shaft horse-power	40,000
Speed	28 knots.
Oil fuel capacity	800 tons.
Cruising radius	5,000 miles.

Those Sky-rocket Shares

SOME pointed remarks on the present aviation share activity were made by Sir Harold Snagge, chairman of D. Napier and Son, Ltd., at the company's twenty-second ordinary general meeting, held on Wednesday of last week.

"In my view," said Sir Harold, "a serious responsibility rests at the present time upon directors of what are called 'aviation' companies, and I am sure that the chairmen of other firms which at present are far bigger suppliers to H.M. Government than we are share my feelings. There is just now a great and urgent national need calling for a supreme effort on the part of a comparatively new industry at the expense of the taxpayer, and profiteering, as I have already stated, will not be tolerated. That aviation shares should, at this juncture, become the most active counter in the speculative share market is perhaps natural and inevitable, but it is none the less to be deplored. Prices and values have got hopelessly out of touch with each other; fantastic capital appreciations are reported daily, and gamblers are no doubt making fortunes, as fortunes have been made (and lost) before in American railways, in diamonds, in gold and in rubber. But the law of gravity is still operative in these matters, and it must not be forgotten that the higher the rocket goes the farther the stick (the part that hurts) has to fall when it has reached its ceiling."

Perth's Problems

PROLONGED frost, retarding the growth of new grass, and damage to the aerodrome during a thaw have made it necessary temporarily to close the new Perth aerodrome at Scone. The ready assistance and co-operation of the Air Ministry has provided for the temporary accommodation of the Airwork Civil Flying Training School at the R.A.F. station at Abbotsinch, near Glasgow. The school, which has already moved its quarters, is likely to return to Perth towards the middle of April.

A Wool-tuft Film

A FILM which is in the nature of a documentary picture rather than a "dry" scientific record will accompany the lecture to be given before the Students' Section of the R.Ae.S. to-night by Mr. W. S. Coleman, B.Sc., D.I.C., A.R.C.S. The lecture is on "Visual Methods of Observing Flow Phenomena," and the film shows the lecturer's flight experiments with wool tufts on a B.A. Swallow wing at and near the stall. Mr. J. A. G. Haslam, of Cambridge University, who is well known as the originator of wool-tuft experiments, will be in the chair.

The lecture takes place at 7 p.m. in the R.Ae.S. library, 7, Albemarle Street, London, W.1.

Private Flying

Topics of the Day

Drift Correction

NEVER having previously examined its possibilities, I have always looked upon a drift sight as a somewhat unnecessary gadget in a light aeroplane. Last week I was given a ground demonstration of its value, and if ever I am lucky enough to own an aeroplane I shall undoubtedly have one fitted if it is possible.

In the early days of one's cross-country flying, studious preliminary allowance is made for drift, either by operating a C.D.C. or by drawing an elaborate vector diagram. After a little while it is discovered that corrections have almost invariably to be made, and that it is really less trouble to hazard a guess, to correct at the end of five minutes' flying and to correct again a little later. When using a drift sight absolutely correct adjustments can be made as soon as one has reached one's operating height —and these adjustments will take a bare minute and will require little or no mental effort.

A *Useful Device*

THE particular drift sight to which I was "converted" is that fitted in the floor of the pilots' compartment of the Fokker F.12 machines to be used by Crilly Airways for their Lisbon service. These F.12s had previously been used on the K.L.M. Batavia run, so that no instrument which is not severely practical would be found therein.

This sight consists of a rotating ring with a pair of grid wires, a pointer and a fixed scale of degrees. With the machine flying on a true course the pilot merely rotates the ring until earthly objects move along, or parallel to, the grid wires and reads off the drift on the scale. If this is, say, --15 deg., he subtracts this from his compass reading and turns on to his new course.

Since the machine will then be flying at a new angle relative to the wind direction, a second, and perhaps a third, correction will be necessary, but the whole job should not take much more than a minute, and, once done, the machine's course is correct until there is a change in the wind direction or strength.

Travelling Serenity

AS one who has been brought up to believe implicitly in instruments, I have always felt that the ideal mode of cross-country flying is one which does not involve earnest map-reading at regular intervals. One should be able to travel along quite placidly and knowing perfectly well that in an hour and twenty-two minutes one will look out and perceive either the terminal aerodrome or a handsome landmark which has already been noted as being within a stone's throw of this aerodrome. So much of this careful study of railway junctions and river curves is absolutely unnecessary.

Not so long ago, while peering through a car windscreen at the vague form of a spot-lit kerb during a long journey in fog, I thought that, with proper facilities, flying should be without such anxieties even in the worst weather. There might still, perhaps, be a tense five minutes while leaving the aerodrome, and another tense five minutes while coming in to another aerodrome on a short-wave beacon. For the balance of the journey the pilot would read a book while an automatic pilot did the work, and at intervals between the reception of information and of D/F bearings. A buzzer would inform him of the appearance of other aircraft at his own height and in the immediate vicinity, while an instrument would give him the stranger's relative bearing.

Such a dream was, perhaps, the inevitable outcome of several anxious hours at the wheel of a car and of a firm belief in the superiority of mechanical devices over the brute human perceptions and judgments. There is no more reason why you should disbelieve your blind approach needles than that you should expect a railway signal system to break down. Last summer my fellow passengers read their books quite serenely while travelling at 70 m.p.h. between Aachen and Brussels, and with the knowledge that the Nord Express was only five miles behind them!

A Changing World

ALL this business of blind flying has altered, too, the whole conception of warfare, and the younger generation of pilots can be forgiven for wondering whether the powers that be are still thinking in terms of 1918—or even of 1911, a year which closely resembles this 1936 in the matter of international fears and imagined hates. Unfortunately, the world's leaders, like good Bourbons, learn nothing and forget nothing.

More than once I have been laughed at for daring to suggest that any amateur with ten hours' blind flying practice and some navigational ability could, if he was allowed to choose his own weather, leave an unknown point in, say, Lancashire or Yorkshire, and drop a flour bomb in Leicester Square without being caught at any time on the way by a single pilot of a large searching Air Force. That with a light aeroplane—and the mythical Power which is supposed to be preparing to attack us will use machines which can fly anywhere between 1,000 and 30,000 ft. at a much higher speed.

Be that as it may, we do not need moonlit nights or cloudless days even for amateur flying, and it will presently be old-fashioned to carry anything much more than a ten-inch map, and very old-fashioned, to glance at it more than once towards the end of a journey. Nor do we suffer from what can only be called a "collision complex" when flying in clouds at a reasonable height. The new generation will prefer the sight of a twitching needle to that of a railway line even in fine weather.

INDICATOR.

FROM the CLUBS

Events and Activity at the Clubs and Schools

TOLLERTON

FLYING at Tollerton, for the week ending February 27, again showed an increase, totalling over twenty hours. Flt. Lt. Linden became a flying member.

REDHILL

An impromptu bomb-dropping competition held last week was won by Mr. G. P. Sargent. Flying times totalled 41 hr. 55 min.

LONDON

Mr. E. R. Ker has joined the London Aeroplane Club and Mr. G. M. Tonge has gone solo. Fifty-eight hours were flown last week.

C.A.S.C.

Last Sunday morning members of the Civil Aviation Service Corps flew 1 hr. 30 min. dual and 45 min. solo. The afternoon was devoted to lectures.

PORTSMOUTH

Messrs. A. P. Skinner, G. J. Christopher Paul, Lt. W. Belowe and Flt. Lt. A. G. Wilde have become members of the Portsmouth Aero Club. Flying times for the week ending February 29 amounted to 25 hr. 50 min.

CAMBRIDGE

Marshall's Flying School and the Cambridge Aero Club flew fifty-two hours last week. Two members took their "A" licences and another pair went solo. It is hoped that four other licences will be taken by next week.

LIVERPOOL

Severe wintry conditions were experienced throughout February, but the total flying time—129 hr. 40 min.—shows a considerable increase over the corresponding figure for last year. The flying time for the last week in January was 38 hr. 10 min.

READING

The film dance last Saturday night produced some outstandingly good costumes, the first prize being taken by Mrs. Crommelin. The Reserve school has been flying hard all the week and two new Hawk Trainers have been added to the fleet. A Merlin, destined for Australia, has emerged from the works.

NORTH STAFFORDSHIRE

The new clubhouse at Meir Aerodrome will be officially opened on Saturday, March 7, at 11 a.m. by the President of the Club, Mr. C. R. Anson, who will be supported by Lord Sempill and the Lord Mayor of Stoke-on-Trent. Members of other clubs are invited to be present and lunch and tea will be provided free for those arriving by air. There will be various demonstrations during the day.

CASTLE BROMWICH

From Friday of this week the Club will remain open for flying during the whole week. Previously, Friday has been a day of rest for the staff. Eleven hours fifty minutes dual and 5 hr. 15 min. solo were recorded during the week ending February 27.

LEEMING

Messrs. B. Harman and J. B. Gothorp went solo during the week ending February 29 and Mr. Kendrew of Middlesbrough made valiant efforts to fly his *Pou*. Yorkshire Aviation Services hope to start building at the York municipal aerodrome within a week or two. Flying time for February totalled 64 hr. 40 min.

HANWORTH

Mr. S. Vickers is the first Hanworth member of the Air League to pass his "A" licence tests. These tests have also been passed by Mr. M. S. Barradell. Mr. S. Topolian has finished his instructor's course and expects to take blind-flying instruction. Messrs. G. Toth, P. N. Veale, and E. A. Bingen have become members. Last week's flying times totalled 48 hr. 35 min.

LANCASHIRE

The chief instructor, Mr. M. F. Ogilvie Forbes, has completed an instructor's blind-flying course at Brooklands. Mr. Colin Wilson carried on nobly in his stead. Thirty-five hours were flown during the past fortnight. New members include Messrs. H. Horner, A. L. Ward, P. S. Marples, W. H. Walch and R. E. Tongue.

HAMPSHIRE

To celebrate the tenth anniversary of the Hampshire Aeroplane Club a dance will be held in the clubhouse next Saturday. During the evening the chief instructor, Mr. K. C. Winton, will give a demonstration night flight. February's flying total was 127 hours. Miss Molly Moldon and Mr. G. R. Thomas have become members; the latter and Mr. K. Lancester have gone solo; and Messrs. H. F. Montgomery and G. R. Thomas have qualified for their "A" licences.

CINQUE PORTS

One of the most successful landing competitions which the Cinque Ports Flying Club has yet held took place on Sunday, March 1. Sqd. Ldr. Down, commanding No. 25 Squadron, Hawkinge, accompanied by Mrs. Down, commenced judging at noon, and carried on until sunset. The winner was Dr. N. Grellier, and he received a small silver replica of the Ashwell-Cooke Cup.

A rapid charter flight was carried out on Thursday. Mr. Duncanson, who is on a course at the Small Arms School in Hythe, wished to ride at Newbury in the afternoon. Telephone communication with Thatcham, a village some two miles from Newbury race-course, secured the necessary road transport, and Mr. Duncanson was on the course in less than an hour and a half after leaving Lympne. The return journey was made with equal rapidity.

THIS ONE FLIES! Remembering the general tendency to be humorous at the expense of the *Pou*, here is photographic evidence of the fact that the Carden-engined model flies—and flies well. Mr. S. V. Appleby, of course, is the pilot. A reasonable supply of power with careful construction and rigging help to explain its successful performance; one of the rigid incidence control rods can be clearly seen. (*Flight* photograph.)

Private Flying

BORDER.

The committee of the Border Flying Club has purchased a B.A. Eagle which should be delivered this week. Mr. G. Thompson has become a flying member. A number of pilots of Tiger Moths from Reserve schools in the North are using Carlisle aerodrome as a refuelling point and others as a stopping place overnight.

LONDON GLIDING

The best flying day of the year at Dunstable, so far, has been February 23, when, in a chilly but "bump-less" west wind, a total of twenty-six hours' soaring was put in by about as many pilots. Thirteen soaring machines took the air, more than half being club-owned. These included the club's latest acquisition from the Slingsby works at Kirbymoorside, the Falcon III side-by-side two-seater, which was busy most of the day taking up passengers for periods of as much as an hour. Another new arrival was an improved version of the Zander & Weyl Cambridge type, recently illustrated in *Flight*.

Often six or seven machines at a time were strung out along the hill, but this was the most the air would safely hold as at this time of year the belt of lift tends to be confined to the immediate neighbourhood of the hill, owing to stable temperature conditions in the atmosphere. Hiscox, however, in the Kirby Kite—another Slingsby production—got up 600 feet, and Dewsbery in the German-built Rhönsperber was higher still. A day like this provides also a splendid opportunity for recently trained soaring pilots to pile up flying experience, ready for the time when the earth warms up and thermal currents arrive to test their skill.

The new building is now in use—an unofficial house-warming was held in the clubhouse a month ago—and the hangar is already full to capacity with nineteen machines fully rigged. Later, after a bit of jugglery with trestles and things, it is expected to hold even more.

ISLE OF WIGHT

The Isle of Wight Flying Club now has sixty members, eighteen being in the flying category. Two have just qualified for their "A" licences. The clubhouse has modern furnishings and has been in use since November 16, 1935. Spartan machines with Gipsy II engines are being used, and the instructor is Mr. W. A. Andrews. Flying time since November 7, 1935 (which was the date on which the Club was recognised by the Air Ministry) totals 57 hr. 40 min. Before that date members put in over seventy hours. A successful carnival ball was held on February 7.

BROOKLANDS

The weather still failed to improve during the fortnight ending March 1, but school flying hours were 100 during this period. Capt. Max. Findlay has returned to duty again after his sojourn at Northampton. Capt. Duncan Davis and Mr. Ken Waller have just left on their cruise. Mr. A. D. J. Allan has now taken his *Pou* over to Reading, where, with the better surface conditions, he hopes to be more successful.

New members were: Messrs. J. F. Keast, J. V. Heriz-Smith, T. S. Gunn, and C. Stonhill, and the Hon. Miss Ruth Cokayne. Miss B. Brice has completed her tests for an "A" licence.

The navigation competition was won last Sunday by Mr. E. G. Vokes. Mr. J. A. M. Henderson was second in his Hornet Moth, whilst Mr. C. S. Burney was third. The Leap Year Dance held in the Club on Saturday was a great success. Mr. S. V. Appleby has now arranged to bring his Carden-engined *Pou* for a demonstration on Sunday, March 8, while General Aircraft are sending over the Jubilee Monospar on March 15.

A landing competition has been arranged for which members may enter any Saturday or Sunday during March. At the end of the month the three competitors having the highest score will be asked to compete in the final.

Luton's Aerodrome

PREPARATION of an aerodrome site on the outskirts of Luton, Bedfordshire, is shortly to begin, and Chamier, Gilbert Lodge and Co., have been appointed aerodrome consultants to the Borough..

It is thought that such an aerodrome would be particularly valuable to those contemplating the establishment of an aircraft factory, and it will be specially laid out for such a purpose.

All communications in connection with factory sites should be addressed to the Town Clerk of Luton.

Not So Technical

WHEN, on February 21, the De Havilland Technical School students held their annual ball at the Hyde Park Hotel the difficulty was, as some self-effacing person remarked, to "find the students."

On the dance floor—which was just pleasantly crowded—and at the supper table could be seen all manner of people connected, directly and indirectly, with aviation. Among the D.H. people were Capt. Geoffrey de Havilland, Mr. C. C. Walker, Mr. Groombridge and Mr. Buckingham, but the affair was, too, as it should be, one at which all the friends of the De Havilland organisation could get together.

Something New from America

WITHIN a fortnight something interesting in the charter-cum-private owner type should be on view at Croydon. During his visit to the States, Mr. Grant, of Surrey Flying Services, obtained the European rights for the Cessna monoplane, and the first purchaser is Mr. Turner, late of Wrightways. The machine is already on its way here, and Mr. Turner intends to use it largely for press charter work.

That the Cessna C-34 is an extraordinarily efficient machine is apparent when one considers that it carries four people at 162 m.p.h. on 145 h.p. In general layout it is a high-wing cantilever monoplane. The wing is in one piece, tapers both in plan form and thickness, embodies solid spruce spars and spruce ribs, and is covered with plywood and fabric. Flaps are fitted between the ailerons and fuselage.

The fuselage is a conventional welded structure of steel tubes, and is covered mainly with fabric. This type of construction is also employed for the cantilever monoplane tail unit. A particularly notable feature is the single-strut cantilever undercarriage which embodies oleo-spring shock absorbers and "streamline" wheels.

The engine, a 145 h.p. Warner Super-Scarab, has a long-chord cowling and a steel tubular mounting. Fuel is carried in the wing.

Four seats are arranged in two pairs, and there are dual controls for those in front. On each side there is a door, and baggage can be stowed aft of the cabin.

Tare and gross weights are, respectively, 1,220 lb. and 2,200 lb. The makers claim a cruising speed of 143 m.p.h.

The Tipsy "S"

THE first of the production Tipsy ultra-light aircraft, designed and manufactured by Avions Fairey, of Gosselies, Belgium, recently undertook a non-stop flight from the aerodrome at Gosselies, near Charleroi, to Paris. The distance was covered in one and three-quarter hours, making an average of 97.5 m.p.h. with no wind. This is a remarkably good average for a machine having an engine of only 25 h.p.

The Tipsy "S" ultra-light single-seater is, of course, a low-wing cantilever monoplane, fitted in this case with the Ava four-cylinder 25 h.p. two-stroke engine, while other engines have also been installed, such as the Douglas and Sarolea. The prototype machine was originally described in *Flight* of June 13, 1935.

The Viceroy's Cup

ALTHOUGH the Miles Hawk was unplaced in the Viceroy's Trophy race, it put up an extremely good performance, averaging 148.3 m.p.h. over the whole 1,500-odd miles, in spite of a head wind for the greater part of the way. According to the Phillips and Powis agents, R. K. Dundas, of New Delhi, the engine was revving at about 2,400 r.p.m. throughout, and no trouble of any sort was experienced.

The Aero Club of India and Burma, in considering the various results of the Viceroy's Challenge Trophy Air Race, 1936, have decided that for the next race the minimum speed at which any machine will be handicapped will be 115 m.p.h. The committee has decided to modify the system of handicapping which has been based hitherto on the manufacturer's advertised speeds. In future a machine of a type which has previously flown in a race will not be handicapped at a speed less than that which it has actually performed in the race.

Scooped!

"This Flying Business," by Alex Monteith and R. F. Thatcher (obtainable through W. H. Smith and Co., Chorley and Pickersgill, or the York County Aviation Club.)

ALAS, as a representative of the trade, *Flight* seems, for once, to have fallen down on the job. Messrs. Monteith and Thatcher have shown us things in their true perspective. We bothered ourselves in our recent Airports Number with mere bagatelles—wireless, hangars, petrol pumps and kindred trifles—but never a mention of such fundamentally important items as beer handles, pin tables and the activities of the Incorporated Siphon Re-chargers.

This Flying Business is devoted to club, and not commercial, flying, and deals in an appropriately flippant manner with "average people who like to fly." These, it is explained, take (in the embryo stage, at least) a deep breath as they ease open the throttle, and a good stiff drink when they arrive safely down again.

The whole book is good fun and the account of a little flying tour of club aerodromes is pleasantly instructive.

"He that hath ears" : A sound locator and searchlight in operation. (*Flight* photograph.)

WITH the SEARCHLIGHTS

A Visit to the Headquarters of the 26th Anti-Aircaft S/L Battalion, R.E. (L.E.E.)

By Major F. A. de V. ROBERTSON

A SENIOR officer of the Royal Air Force once remarked to the present writer, "There can be no interception of night raiders without searchlights."

That remark shows the tremendous importance of having very well trained searchlight units in our scheme of air defence. In fact, it would be impossible to overestimate the importance of the work of the searchlights. We all hope that there will not be another great war for a very, very long time, but none the less we must be prepared in case the worst should happen. If, despite all our love of peace, an enemy should attack our shores, the probability is that the first act of war would be a night raid by enemy bombers on London. If no searchlights were ready to show up the raiders, and to point out the targets to our gunners and our fighter aircraft, the result might be terrible. With our air defences well organised and well trained, the best authorities believe that we shall be able to hit the raiders so hard that they will soon find the game of raiding London not worth the candle. But without searchlights and very well-trained searchlight crews we should be able to do nothing, and London would lie open and undefended to the night raiders of the enemy.

The Government has entrusted the working of these all-important searchlights to the Royal Engineers of the Territorial Army. It is a very great compliment indeed

Traverse and elevation : By the use of a long-arm control, very fine adjustment of the searchlight beam can be obtained. (*Flight* photograph.)

Up to three thousand : For low-flying aircraft the sound-locator crew man the Lewis gun. (*Flight* photograph.)

should be most anxious to take part. The Territorial Army searchlight battalions and anti-aircraft batteries are raised and administered, and on occasions paid, by the War Office and the County Associations, but for operations they come under the command of the Air Ministry. At the head of all the operations is the Air Officer Commanding Air Defence of Great Britain, while one of his commanders is the A.O.C. Fighting Area. It is with the Fighting Area that the searchlight battalions have most to do, for the task of many of the searchlights is to point out the raiders to the fighter aeroplanes which are up on night patrol. Other battalions are more particularly entrusted with the task of showing the bombers to the anti-aircraft batteries, but all form part of the organisation of Air Defence of Great Britain.

"L.E.E." Explained

In order to learn more about this highly important section of our defences, representatives of *Flight* recently paid a visit to the 26th Anti-Aircraft Searchlight Battalion, R.E. (L.E.E.), at their headquarters at the Duke of York's Headquarters, King's Road, Chelsea. The initials L.E.E. call for explanation. They stand for London Electrical Engineers, and recall the interesting and honourable history of this fine unit. They were raised as Volunteers in the days of Queen Victoria as the London Electrical Engineers, and their original task was to operate electrically fired mines off the coast. The unit first saw active service in the South African war, when a few detachments were sent to the front to work field searchlights. In that way they first became familiar with the weapon—if one may call it a weapon—which is now their chief business. When the electrically operated mines went out of use, the unit, which had been changed from Volunteers to Territorials, was given charge of searchlights on the coast, and they

which has been paid to the Territorial Army, for on the first suspicion that air raids were possible, the searchlights would have to be manned and take up their positions. Their crews, together with the T.A. gunners of the anti-aircraft battteries, would be the first men in all Britain's defence forces to come into action. That in itself would be a very great honour. Moreover, they would have the feeling that they were defending their own homes. To catch a raiding bomber in the beams, to hold him there, passing him on from light to light, until the fighter aeroplane flew up and dealt with him—and finally to watch the enemy crew coming down by parachute from their shattered aeroplane—would be, perhaps, the purest joy that anyone could get out of active service. Each sapper would feel, "Well, that fellow at least will not drop a bomb on *my* home."

One point should be made quite clear. There are anti-aircraft searchlight units in the regular Army, but their work is to go wherever the Army may be sent, and to guard its lines of communication. They have nothing to do with the air defence of London and of Great Britain; that task has been allotted to the Territorial Army alone, and it is a task in which every Londoner, to say nothing of the citizens of other cities,

Found, by the sound of it : By a careful balance of intensity of sound the locator finds the raiding bomber for the searchlight. (*Flight* photograph.)

Stereoscopic ears : A front view of the sound locator. (*Flight* photograph.)

worked them in the early days of the Great War. Before long the first anti-aircraft searchlight detachments were formed, and during the rest of the war this unit found a great number of these detachments, some for Home service, and some for service overseas. At the end of the war the unit was disbanded, but later the 26th and 27th A.A. Searchlight Battalions were formed from late members of the old L.E.E., and both battalions have in consequence been granted the privilege of keeping the honourable initials.

The visit to the battalion was intensely interesting, and it was a pleasure to see the keenness with which the sappers handled their various instruments and weapons, though the night was not exactly as hot as India is in May. The searchlights themselves are, of course, the chief concern, but lights require current, and this is provided by petrol-electric lorries or by stationary generating sets, or by semi-mobile sets. Then, when the beam is ready to work, it must have direction. It does not wildly sweep the skies at random. The sound-locators guide it on to the bombers as they fly overhead. At present the battalion is equipped with an old pattern of locator, such as is shown in the illustrations. A new pattern will very soon, it is hoped, be issued by the War Office. Even the old pattern is an extremely fascinating instrument. Two trained men put on the earpieces of one instrument. One is concerned with traversing in order to get the right direction. When the noise in both his ears is equalised the locator is directed towards the point of the compass where the bomber is. The other man is concerned with elevation, and when he hears the noise at a maximum intensity the instrument is pointing up at the correct angle to guide the searchlight on to the raider. A dial gives the angle, and when more than one instrument gets on to the same bomber it is an easy matter to calculate its height as well as its direction. This result is checked by a visual plotting instrument after the beam has caught the bomber, and this too is a simple and very effective device. Finally, there is an anti-aircraft machine gun. This would only be brought into action if the raid came in at a height of three thousand feet or lower. In the Great War aeroplanes sometimes fired at enemy searchlights, and if that were to happen this gun would be used.

All these branches of work are very interesting, and the battalion trains its recruits in all the branches. A proportion of skilled men is required for the trades of electrician, engine driver (of stationary engine), motor driver, and fitter. A listener on the sound-locator is a specialist job, for which the men are trained in the battalion, and there are other jobs for which it is not necessary that the recruit should be a highly skilled engineer. It can safely be said that any intelligent craftsman will be welcomed and will be trained to a trade in which he can take an interest and a pride. Moreover, in any military unit there is always need of a certain number of unskilled men, who will have all the privileges of members of the unit and will be able to feel that their work is of real service to their country, and particularly to their home city.

Service Requirements

Territorials, when they enlist, always undertake to serve abroad if Parliament decides that that is necessary; but in the case of the anti-aircraft units which work under Air Defence of Great Britain that is not very likely to happen. For operations they are under the orders of the Air Ministry, as was stated above, not under the War Office. At the age of 38 their liability for foreign service comes to an end, but they may remain in the battalion as home-service men up to the age of 50. Men will therefore be accepted between the age of 17 and 38 for general service, and up to about the age of 42 for home service only. They join in the first place for four years, and can re-engage in periods of one to four years up to the age limits. They undertake to attend a minimum of forty drills during their first year and twenty in later years, and also to attend camp each year

"Where the rainbow ends": A close-up showing the business part of the searchlight. The voltage and amperage meters are seen on the control panel. (*Flight* photograph.)

(Left) A complete section of the 26th Anti-Aircraft S/L Battalion with mobile outfit. Below is seen the interior of one of their lorries containing a generating plant. (*Flight* photographs.)

for a fortnight. The battalion, however, expects that no member will be content to do only the minimum, but to attend at least one drill a fortnight during nine months of the year. If it is impossible for a man to attend the whole fortnight at camp, he is allowed to attend for only eight days, provided that he puts in ten extra drills. During camp, and on certain other occasions, the men receive pay. The lowest rate is 2s. a day, and a skilled sapper gets up to 5s. a day. A N.C.O. can rise to 11s. 5d. a day. In addition each man gets a proficiency grant each year on fulfilling his engagements.

This battalion has just been instructed to raise another company, and recruits are wanted, and some additional officers as well. It is really surprising that the men of London do not tumble over each other in applying to join such a battalion. Not only is the work most interesting and, as we pointed out above, of the utmost importance, but the attractions of membership are very great. The headquarters are very conveniently situated, and any Londoner can easily get to the Duke of York's Headquarters at Chelsea. There they find, not only interesting work, but a very friendly club. At headquarters there is a recreation room, a canteen, a billiards table, a piano, and other attractions. Good entertainments are given during the winter months, and the men can use the athletic ground at the headquarters. Members can compete in the events organised by the Territorial Army Sports Board.

The Annual Camp

The annual camp makes a strong appeal. It is usually held at the seaside or in the country. The work then becomes more interesting than ever, for the camp is usually held at the same time as the Air Ministry holds its annual Air Exercises, and during those exercises there are plenty of raiding bombers for the searchlights to find and hold.

Apart from all this, a Territorial camp is a most excellent form of holiday, and many Volunteer camps at home and in India are among the most pleasant memories of the present writer. The battalion also holds two or three week-end camps during the year, and pay and rations are issued during these.

Actual drill does not form a large part of the training of Royal Engineers in the searchlight battalions, but a certain amount has to be done. This gets its reward on State occasions, such as the Jubilee last summer. Then a detachment of the 26th A.A. S/L Battalion was on duty, and another detachment also took part in the funeral procession of King George V. Men are naturally anxious to be chosen for such duty, and very proud are those who are selected. It may be remembered that before long there will be the Coronation of King Edward VIII.

To conclude, this searchlight battalion is most certainly a fine unit, and one which London men ought to be only too anxious to join. Intending recruits should apply to the Adjutant at the Duke of York's Headquarters, King's Road, Chelsea, S.W.3. His office is open every weekday from 9 a.m. to 4.30 p.m., on Saturdays until 1 p.m., and on one evening of the week—that of Wednesday—from 7 p.m. to 10 p.m.

All Clear! A sapper "douses" the searchlight. (*Flight* photograph.)

SIX TIMES VICTORIOUS

The Esher Trophy Once Again Won by No. 605 (County of Warwick) Bomber Squadron, Anxiliary Air Force

BIRMINGHAM'S grand Town Hall was the scene of this year's presentation of the Esher Trophy, which is awarded annually for general efficiency among squadrons of the Auxiliary Air Force. For two years past it has been won by No. 605 (County of Warwick) Bomber Squadron, and this year's victory makes the sixth time that the award has been made to that outstandingly efficient and enthusiastic unit. Sadly enough, the presentation also marked the retirement of Sqn. Ldr. J. A. Cecil Wright, A.F.C., T.D., D.L., who has been identified with the squadron's prolific successes for ten years past.

A *Notable Party*

The chair was taken by the Lord Mayor of Birmingham (Alderman S. J. Grey, J.P.), and the presentation was made by Air Marshal Sir John M. Steel, K.C.B., K.B.E., C.M.G. On the platform were the Chairman, Warwickshire T.A. and A.F. Association (Col. Sir Henry R. Fairfax-Lucy, Bt., D.L., J.P.); Air Marshal Sir John Higgins, K.C.B., K.B.E., D.S.O., A.F.C.; Capt. the Lord Willoughby de Broke, M.C.; Alderman J. B. Burman, J.P.; Capt. (E.) F. V. King, R.N.; the Vice-Chairman of the Warwickshire T.A. and A.F. Association (Col. F. G. Danielson, D.S.O., T.D., D.L., A.D.C.); the Air Officer Commanding No. 1 Air Defence Group (Air Comdre. J. C. Quinnell, D.F.C.); Col. J. L. Mellor, M.C., T.D., D.L., J.P.; Col. W. C. C. Gell, D.S.O., M.C., T.D., D.L.; Col. O. B. F. Planck, D.S.O., T.D., D.L.; Col. R. A. Broderick, D.S.O., M.C., T.D., M.B. (representing the Divisional Commander, 48th (S.M.) Divisions); the O/C. No. 605 (County of Warwick Bomber) Squadron, A.A.F. (Sqn. Ldr. J. A. Cecil Wright, A.F.C., T.D., D.L.); and the Secretary, Warwickshire T.A. and A.F. Association (Lt. Col. A. Erskine-Murray, D.S.O., D.L.).

On his arrival, Air Marshal Sir John Steel inspected the guard of honour, a smart body and worthy of the squadron.

The Lord Mayor read a letter from Viscount Swinton congratulating the squadron and its Commanding Officer. He (the Lord Mayor) likewise spoke very highly of Sqn. Ldr. Wright who, he said, has not been lost to public service as he is filling a post on the City Council where his knowledge of aeronautical matters will be of the utmost value in planning the airport.

Air Marshal Sir John Steel, in his speech prior to the presentation, thought that the original intentions of Lord Esher had been successfully carried out. In spite of changes in the regulations, "605" persistently carried off the trophy; in fact, people were getting rather tired of it. He confessed that, although one of those concerned with the formation of the Auxiliary Squadrons, he was at their conception none too happy about the outcome. He realised now their full worth and their ability to act as a deterrent if someone should do something he ought not to do. Nobody could say they were actuated by a warlike spirit. His lay mind found it difficult to follow the reasoning of the type of person who advocated the abolition of squadrons and yet persisted in poking his head into every bit of trouble.

The Presentation

Air Marshal Sir John Steel emphasised the fact that the standard of the Auxiliary Squadrons in the air was the same as that of the Regulars. There were no "learners" discs on their machines.

Speaking of the suggested formation of additional Auxiliary squadrons he said that when the crisis came the Air Ministry would be on the trail of Birmingham for not having provided four squadrons, and on his own trail for not having 140. Luckily there was plenty of open ground near Uxbridge to enable him to effect an escape when the gibbet was erected.

After Air Marshal Sir John Steel had handed over the Esher Trophy, Colonel Sir Henry R. Fairfax-Lucy presented a replica to Sqn. Ldr. Wright, and moved a vote of thanks to the Air Marshal.

Sqn. Ldr. Wright spoke, as he put it, with mixed feelings, of ten of the happiest years of his life, and took it that the gift acknowledged the work of everyone in the squadron.

Alderman J. B. Burman welcomed Sqn. Ldr. Wright to the City Council, and spoke of his work in connection with one of the finest airports in the kingdom.

Telling the Public How

LAST week's B.B.C. talk in the "Conquest of the Air" series was by Capt. J. Laurence Pritchard, secretary of the R.Ae.S. His subject was "The Designer's Task," and very well did he deal with it, every one of his explanations being so worded that no non-air-minded listener could possibly have failed to understand them. He concluded with some very sound remarks of the variety which, though they may strike the initiated as glimpses of the obvious, must and should be uttered and re-uttered, slogan-fashion, until somebody does something about them. By way of example, we may quote Capt. Pritchard's "Somebody should offer a big prize for the *slowest* aeroplane."

Last Tuesday evening Mr. Ivor McClure, of the Air Ministry, was due to tell us about "Making Flying Safe," and next Tuesday Brigadier-General P. R. C. Groves is to speak on "Britain's Place in the Air." The B.B.C. is letting the public hear all sides.

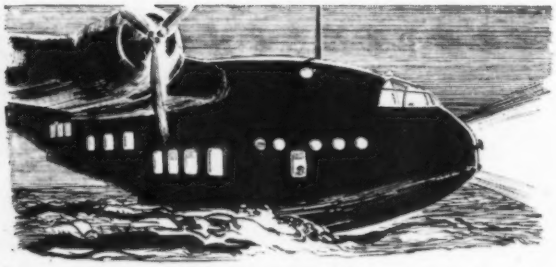
A Shell Appointment

MR. S. C. W. MELLSTROM, better known as "Steve of Shell" to the motor racing fraternity, has now been appointed to the Aviation Department of Shell-Mex and B.P., Ltd.

Mr. J. H. Simpson will succeed him as motor racing representative of the company.

Forthcoming Events

Mar. 5. R.Ae.S. Students' Section Lecture: "Airflow Experiments," by W. S. Coleman, 7 p.m. R.Ae.S. Library.
Mar. 6. Leicestershire Aero Club: Dinner and Ball, Grand Hotel, Leicester.
Mar. 10. Royal United Service Institution Lecture: "The Development of Civil Aviation," by Lt. Col. F. C. Shelmerdine, at 3 p.m.
Mar. 19. R.Ae.S. (Coventry Section) Lecture: "Type-Testing of Aircraft" by Flt. Lt. Bulman, 8 p.m., Armstrong Siddeley Canteen.
Mar. 19. R.Ae.S. Students' Section Lecture: "The Monoplane Solution," by R. C. Abel, 7 p.m., R.Ae.S. Library.
Mar. 20-22. Re-union of Halton Belgium Tour parties High Leigh, Hoddesdon, Herts.
Mar. 23. R.Ae.S. Lecture: "Welding," by R. H. Dobson Institution of Electrical Engineers, 6.30 p.m.
Mar. 26-29. Yorkshire Gliding Club: Members' Meeting.
Mar. 31. R.Ae.S. Students' Section Lecture: "The Test Pilot's Job," by K. G. Seth-Smith, 7 p.m., R.Ae.S. Library.
April 15. R.Ae.S. (Coventry Section) Lecture: "Aircraft Instruments," by Mr. J. E. Charlton, 8 p.m., Armstrong Siddeley Canteen.
April 17. Norfolk and Norwich Aero Club: Annual Dinner and Dance.
April 23. "New Light on Strength of Materials Afforded by Modern Physics," by Dr. H. J. Gough. Institution of Electrical Engineers, 6.30 p.m.
April 24. Bristol and Wessex Aeroplane Club: Annual Ball.
April 28. R.Ae.S. Students Section Lecture: "Application of Aerodynamics to Mechanical Engineering," by J. L. B. Jones, 7 p.m., R.Ae.S. Library.
May 15-18. Yorkshire Gliding Club: Open Meeting and Competitions.
May 15-June 1. Stockholm Aero Show.
May 23. Empire Air Day.
May 27-June 4. Austrian Aero Club: Whitsun Tour.
June 6. R.A.F. Flying Club: Annual Display.
June 6-14. Czechoslovakia Aero Club: Tour.
June 20. Brooklands Flying Club: "At Home."
June 27. Royal Air Force Display, Hendon.
July 10 and 11. King's Cup Race.
August 1-2. Yorkshire Gliding Club: Open Meeting.
August 15-30. Yorkshire Gliding Club: Open Meeting and Competitions.
September 5-6. Aero Club of Hungary: Week-end Aerien.
Nov. 13-29. Fifteenth International Aero Exhibition, Paris.



An impression of the Empire boat alighting at night. A retractable landing light is on the port bow.

COMFORT on th

Details of the Accommodation in the ... Tested in a Month's Time : S...

NEVER in the history of flying has there been a parallel to the activity in civil flying boat construction, the beginnings of which are now to be seen at the Rochester works of Short Brothers. It may be recollected that in his speech at the annual meeting of Imperial Airways, Ltd., the chairman, Sir Eric Geddes, announced that an order had been placed with Short Brothers *for no fewer than twenty-nine new flying boats.* The first six of these are now being built and are in various stages of completion. When the farthest advanced leaves the stocks in a few weeks' time, the keel will be laid for another, and thus will begin a steady stream of new flying boats taking the water on the river Medway.

It might have been thought that to place so large an order for a new type of civil aircraft would introduce an element almost of gambling. With a firm of the long experience possessed by Short Brothers the uncertainty can be assumed to have been reduced almost to vanishing point. Admittedly the new Empire boats are quite different from any so far produced at Rochester, but the firm's experience over a long period of years, during which a whole "family" of flying boats has been produced, is such that the design and construction were undertaken with a great deal of confidence. The foundations of the fame of Short Brothers were, of course, laid during the earliest days of flying. In more recent times there issued from the Rochester works such types as the Calcutta, with its military version, the Rangoon, the Singapore I, II and III, the Kent, the "Knuckleduster" and the Sarafand. With one exception these boats were biplanes, the exception being the "Knuckleduster," which owed its nickname to the peculiar shape of its monoplone wings and the placing of two engines at the bend in the wings.

Past Experience

Some of these flying boats had two engines, some had three, some had four, and one had six, so that the experience covers not only a wide range of sizes, but also a considerable variety of power plants and power plant arrangements. Thus the step from the previous to the present type of boat is not so great as one might think, in spite of the fact that externally no less than internally the new Empire boats differ materially from their predecessors.

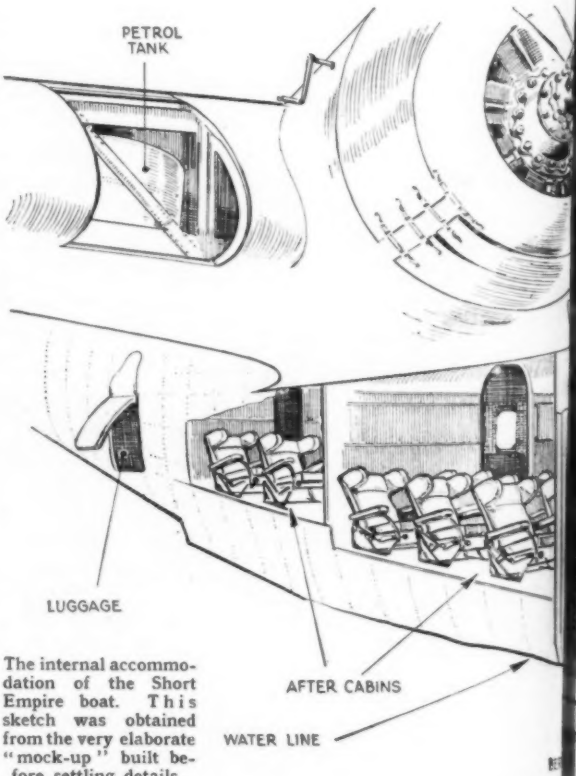
Perhaps it is not generally realised that Short Brothers built a flying model of the Empire boats and tested it out thoroughly quite a long time ago. The Short Scion, and more recently its four-engined version the Scion Senior, was built largely to test out the wing position and to a considerable extent the wing construction in anticipation of the big boat. True, it has a fuselage in place of the boat hull, but many of the features are repeated in both types, and at the present time flying tests with a Scion are being carried out with a view to getting the fullest possible data on the new type of trailing edge flaps which are being used in the large boats.

All in all, there are not a great many untried features in the new Empire boats, so that one need not expect any serious trouble due to innovations. And as Mr. Gouge, Short's general manager, points out, as soon as any aircraft has been built and flown, the constructors can always see possibilities for improvements. If it had been decided to await results of flying tests with the first machine, it would have been several years before any great number of the new boats could go into service. It was decided to proceed from the start with several boats, and to take some slight risk of having to carry out minor modifications should such be found necessary. Knowing Mr. Gouge's work, *Flight* has no misgivings about the outcome of this somewhat bold policy.

For the present it is not possible to publish a detailed description of the manner in which the Short engineers have solved the structural problems, but a visit to Rochester the other day afforded an opportunity to see the very elaborate "mock-up" built to guide the constructors and operators in planning the internal accommodation. The sketches and photographs were in fact obtained from this "mock-up," which is, of course, built full size and includes the hull from bow to rear step, and the wing from centre line to just beyond the outer engine.

The Hull

In designing the hull for the Empire boats, the Short engineers departed somewhat from previous Short practice in their selection of beam-depth ratio. The actual ratio employed was probably selected partly from structural and partly from "practical" considerations. Here we are concerned with the latter only. There are objections to a hull of very wide beam, as it removes a considerable number of passengers from the windows. With a narrow hull, on the other hand, no passenger need be more than



The internal accommodation of the Short Empire boat. This sketch was obtained from the very elaborate "mock-up" built before settling details.

MPIRE ROUTES

Flying Boats : First Machine to be Berths for Sixteen Passengers

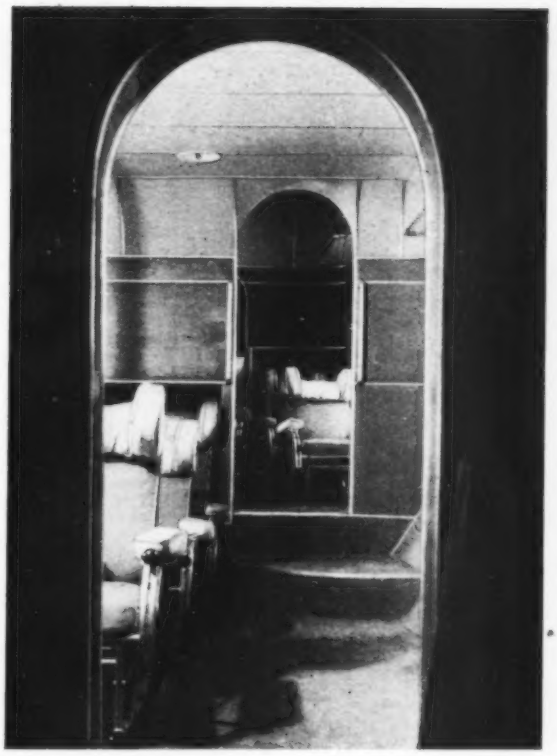
one seat from a window and thus has a good view.

Increasing the height of the hull gives lofty cabins, and affords an opportunity for dividing the hull space into upper and lower "decks." For instance, the smoking room which follows immediately aft of the bow marine gear compartment extends partly under the pilots' cockpit and wireless operator's and navigator's compartments. After it follows the pantry on the starboard side and lavatories on the port side. Between the two main spar frames is a small cabin, and aft of that two larger cabins.

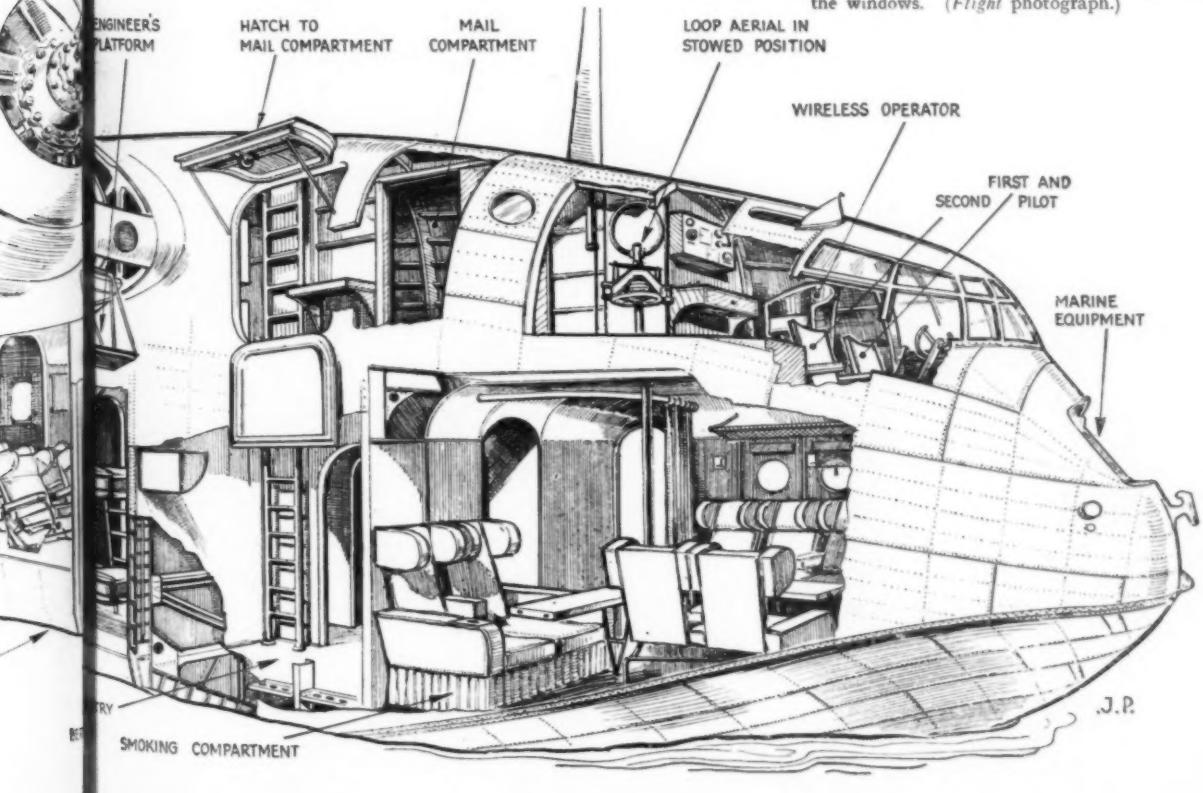
Accommodation is provided for twenty-four daytime passengers and sixteen sleeping berths, the assumption being that on a route such as the London-Australia, only a percentage of the passengers will be travelling right through, the rest travelling over single stages. Arrangements are made for stowing the berths and bedding in the "loft" above the cabins during daytime.

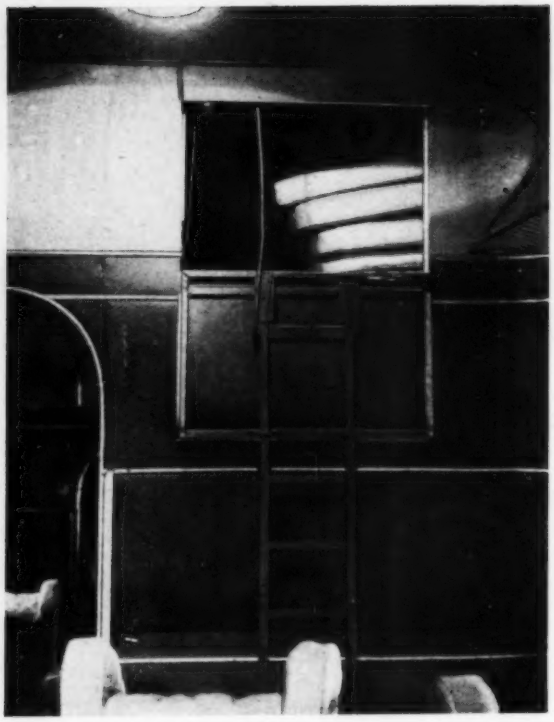
Thanks largely to the efforts of Mr. Rumbold, the comfort in the cabins is of a very high order, the seats being adjustable for height and angle of tilt, while great care is being taken in the actual boats to introduce effective sound proofing so that it is legitimate to expect that the noise level in the cabins will be very low indeed.

A great deal of thought has been devoted to the layout of the pilots' cabin and crew's accommodation generally. Raised as they are well above the waterline, and near the bows, the two pilots have a remarkably good view in all essential directions. Behind them, and on a slightly higher level, is the wireless operator's post. This will be equipped with a very complete outfit, and as an



A portion of the middle cabin, with steps leading up to the after cabin, which is on a slightly higher level. On the port side there are no chairs, the floor space being used as a small promenade deck. A hand rail runs along under the windows. (*Flight* photograph.)





During the daytime the berths and bedding are stored in the "loft" above one of the main cabins. How the berths are arranged in the small cabins between the spar frames is shown on the right. (*Flight* photographs.)

indication of the care taken to keep down drag, the loop aerial is withdrawn into the wireless compartment when not actually in use.

On the same level as the wireless operator, but on the starboard side, is a compartment which will serve as a chart room for the navigator. One interesting feature which might be mentioned here is the placing of the drift sight in the wing root. A door in the compartment permits the navigator to put his head inside the wing root and to look straight down through the drift sight.

Until the first machine has been tested it is not possible to publish actual performance figures, but it may be stated that the cruising speed is expected to be in the neighbourhood of 150 m.p.h. The range will, of course, vary according to the stages to be flown, but fuel tankage for 1,500 miles is provided. With this, however, the full pay load will not be carried. The pay load, by the way, ranges from 3½ to 5 tons, according to the amount of fuel carried. As twenty-four passengers with their luggage would account for less than 3 tons, it will be seen that for most stages likely to be flown there is a considerable margin for mails. It is important to bear this in mind, since otherwise the relatively small number of passengers is likely to cause surprise.

Four Bristol engines are mounted in the leading edge of the wing, and all the petrol tanks are carried inside the wing so that there is no fuel in the hull, even when the boat is used for maximum range. Three-bladed controllable-pitch airscrews (De Havilland) will be fitted, and as the trailing edge flap is of a special type which can be used during the take-off, the run of the Empire boats should be relatively short, even when they carry full load.

Air Leaguers' Free Insurance

A SCHEME of free insurance for its members travelling on British air lines is announced by the Air League.

Air Comdre. J. A. Chamier, Secretary of the League, states that the scheme operates from the moment the journey begins, by bus or otherwise, from the recognised airway terminus and remains in force until the terminus at the other end is reached.

Only those members of the Air League who book their passages through the League are eligible. No forms need be filled up. The scheme provides for £1,000 at death or in the event of certain major injuries, with a year's benefit at £5 per week for total disablement.

Full details are obtainable from the Air League of the British Empire, 19, Berkeley Street, London, W.1.

A Junkers History

JUST over twenty years ago, on December 12, the first all-metal Junkers military monoplane took off from Döberitz, near Berlin, on its first flight. The *Tin Donkey* they called it, but it was destined to be the precursor of hundreds of metal machines which were to penetrate to all quarters of the globe.

This and subsequent machines and engines of the Junkers range are dealt with in *Junkers and World Aviation*, which has recently been translated into English by Edward Morley and is obtainable from W. H. Smith and Son, Ltd., Strand House, Portugal Street, London, W.C.2. Actually its record of the Junkers fortunes starts with 1909, and the development of the products bearing the name is traced up to the end of 1935.

"CP." Honoured

THE aeronautical correspondents of the majority of the leading newspapers as well as representatives of the technical Press were present at a dinner given by them to Mr. C. P. Robertson, of the Air Ministry's Press Section, last Friday at the Café Royal.

Major C. C. Turner, of the *Daily Telegraph*, presided, and Mr. Robertson was duly presented with a silver inkstand and cigarette case, "in token of the affectionate regard of his colleagues in aeronautical journalism."

"C.P." has been head of the Press Section since 1919, and has been largely responsible for the good relations which have, generally speaking, been apparent between the Air Ministry and the Press.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — *AIR MINISTRY ANNOUNCEMENTS*

THE N.W. FRONTIER OF INDIA

In a recent issue of the *London Gazette* it was notified that the following had been mentioned in despatches in recognition of distinguished services during the Loe-Agra operations on the N.W. Frontier of India, February-April, 1935:—

Sqn. Ldr. James MacGregor Fairweather, D.F.C.

F/O. William John Craig.

L.A/C. (now Corporal) Douglas Rupert Woolnough.

STAFF COLLEGE, CAMBERLEY

The undermentioned officers have completed satisfactorily the course at the Staff College, Camberley, which terminated in December, 1935:—Sqn. Ldrs. C. R. Steele, D.F.C., *p.s.a.*, and E. J. Kingston-McCloughry, D.S.O., D.F.C., *p.s.a.*

IMPERIAL DEFENCE COLLEGE

The following officers have completed satisfactorily a course at the Imperial Defence College which terminated in December, 1935:—Group Capt. C. C. Darley, C.B.E., A.M., *q.s.*, Wing Cdrs. G. B. A. Baker, M.C., *p.s.a.*, Hon. R. A. Cochrane, A.F.C., *p.s.a.*, H. H. M. Fraser, *p.s.a.*, and A. S. G. Lee, M.C., *p.s.a.*

ROYAL AIR FORCE COLLEGE

The following flight cadets have successfully completed their course of training at the Royal Air Force College. The names are arranged in alphabetical order:—

Atkins, A. R. (Winner of Air Ministry Prize for Aeronautical Engineering), Banthorpe, E. (Winner of J. A. Chance Memorial Prize), Chorlton, J. A. (Winner of Air Ministry Prize for Humanistic Subjects), Darwen, J., Dickenson, P. G. S., Dowland, J. N., Dudgeon, A. G., Elsmie, G. (Winner of R. M. Groves Memorial Prize), Foster, F. R., Green, J. D., Jeffries, R. K. (Winner of Abdy Gerrard Fellowes Memorial Prize), Longmore, R. M., Lumsden, D.O.F., Mathias, L., Mayhew, J. C., McIntyre, D., Pike, P. J. K. (Winner of H.M. The King's Medal), Press, C. H., Reynolds, R. W., Rivett-Carnac, T. S., Rowbottom, W. L., Skinner, M.P. (Winner of Sword of Honour), Smith-Rewse, B. E., Thompson, J. G.

PERMANENT AND MEDIUM SERVICE COMMISSIONS

In the examination held last November for Short Service officers to qualify for specialising in Engineering, Signals and Armament, twenty-nine officers reached the qualifying standard, and specialisation vacancies will be allotted to the first fourteen, whose names are given below. Those bracketed together obtained equal marks. Subject to physical fitness, arrangement will be made for those marked "E" to join the Home Aircraft Depôt, Henlow, for the specialist "E" course commencing on September 21, 1936, those marked "S" the Electrical and Wireless School, Cranwell, for the specialist "S" course commencing on April 27, 1936, and those marked "A" the Air Armament School for the specialist "A" course commencing on July 6, 1936.

Flying Officers

1. Holmes, P. H.	...	"S."	8. Scott, I. A.	...	"S."
2. Salmon, K. D.	...	"E."	9. Russell, H. M.	}	"E."
3. Keddie, W. M.	...	"E."	10. Stewart, C. M.	}	"S."
4. Hope, N.	...	"E."	11. Fraser, C. F. S.	...	"A."
5. Dean, H. W.	}	"A."	12. Stanton, H.	...	"E."
6. Macdonald, G. E.	}	"A."	13. Wakelin, N. W.	...	"E."
7. Allen, H. R.	...	"A."	14. King, E. B.	...	"E."

Non-specialist permanent commissions are granted to the following flying officers:—Allsop, H. G. L., Amison, G. N., Biggar, A. J., Bradley, R. M., Buchanan, J. W., Crockart, N. D., Darley, H. S., Dixon, F. H., Grindell, G. J., Harding, A. J. D., Hill, J. H., Howie, G. R., McGhie, I. J., McLean, J. S., Pryde, G. A. M., Radford, D. S., Smith, E. T., Young, R. H.

Non-specialist Medium Service commissions are granted to the following flying officers:—Byram, C. S., Craig, W. J., Denison, H. D. U., Devas, W. G., Evans, J. C., Fleming, W. B., Fry, H. L., Gibbs, E. P. P., Hamilton, A. F., Hilton, F. W., Keiller, D. R., Langton, A. W., McAulay, W. McA., McKeown, D. P., Morton, T. B., Oldfield, J. H. R., Rumsey, J. R. L., Spottiswoode, A. N., Thompson, E. G., Warner, C. H. T., Watts, J. J., Wilkins, P. N. J., Young, J. W.

A NEW STATION FLIGHT

Station Flight, Northolt, formed on January 6.

NEW F.T. SCHOOL

No. 9 Flying Training School began to form at Thornaby, Yorkshire, on Monday last, March 2. The Commanding Officer is Group Capt. C. H. Elliott-Smith, A.F.C., lately on the staff of the Inland Area.

A GOOD FLIGHT

A Supermarine Scapa of No. 202 (F.B.) Squadron flew from Malta to Gibraltar (about 950 miles) last week in fourteen hours.

THE CRUISE TO JAPAN

The visit of No. 205 (Flying Boat) Squadron to Japan has been cancelled on account of the situation following the assassinations of Japanese Ministers. One of the Singapores was held up at Amoy with engine trouble, and the other two had reached Shanghai.

NEW STATIONS

Five new sites for aerodromes have recently been chosen. There will be armament training camps at Woodsford, Dorset, for the Chesil Bank range; at Penrhos, Caernarvonshire, for the Hell's Mouth range; and at West Freugh, Wigton, for the Luce Bay range. Other sites are at Linton-on-Ouse, Yorkshire, and South Cerney, Gloucestershire.

R.A.F. STAFF COLLEGE

The next qualifying examination for the R.A.F. Staff College will be held from Tuesday, January 19, to Thursday, January 21, 1937, inclusive.

R.A.F. DINNER CLUB

The annual dinner of the Royal Air Force Dinner Club, originally arranged for Friday, June 26, the evening preceding the Royal Air Force Display, will not now take place until November or December. The date will be announced later.

R.A.F. BENEVOLENT FUND

The usual meeting of the Grants Committee was held at Iddesleigh House, on Monday, February 24. Mr. W. S. Field was in the chair, and the other members present were: Mrs. L. M. K. Pratt Barlow, O.B.E., Air Comdre. B. C. H. Drew, C.M.G., C.B.E., Wing Cdr. C. E. H. James, M.C., Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C. The Committee made grants to the amount of £177 11s. 1d. The next meeting was fixed for March 9.

LONG SERVICE AND GOOD CONDUCT MEDAL

The Long Service and Good Conduct Medal has been awarded to the undermentioned airmen:—W.Os Crowe, W. H., Gibbs, H. J., Kerby, W. I. G.; W.Os Catt, S. E., Edwards, A. W.; F./Sgts. Abbinett, S., Abbitts, R. N., Allen, C., Atkinson, G. V., Balsdon, C., Beadle, E. T., Benney, C. E., Brown, J. E., A.F.M., Burton, W. C., Carter, W. A., Claxton, N. L., Cockram, A. W., Davey, L., Dodds, G. W., Etteridge, E. W., Gallie, J., Gee, T. G., Goat, G. W., Green, A. W., Horton, J. E., Jackson, R. J. B., Jay, N. L., King, W. H., Knowles, A. B., Lea, H., Leary, E. S., Marshall, C. R., May, F. W., Middleton, W. R., Murphy, A. H. F., Pallant, H., Parker, H., Radford, J., Reed, W. S., Sparks, L. A., Trezise, E. A., Tucker, C. E., Ward, W. E., White, E. H.; Sgts. Atkins, A. T., Bollons, L., Bowers, W. S., Brice, R. E., Copp, J. M., Dolphin, S. W., Dunscombe, W. J., Egan, V., Fryer, M. E., Greenfield, R. G., Holmes, F., D.F.M., Hunt, W. R., Killian, W. J., Lidiard, E., Lough, G. M., Malone, J., Masson, W., Mayne, E., Moss, H. C., Murphy, J. D., Pring, W., Quinn, J., Roberts, A. E., Stockey, E. T., Symington, G. A., Tilbury, A. P., Walsh, H. W.; Cpl./A./Sgt. Bellingham, L.; Cpls. Brookes, C. R., Button, W. J., Crockford, W. C.; Fowgies, H., Grisbrook, F. L., Hart, M. G., Howard, G., Kay, V. N. G., Lissamer, R. B. J., Makin, J. R., Cpl./A./Sgt. Mann, D. H.; Cpl. Morrell, A. H. A.; Cpl./A./Sgt. Myers, E. H.; Cpls. Pierce, W. F., Pratt, F. W., Pugh, R. A.; Cpl./A./Sgt. Segrove, J. E.; Cpls. Shears, W. L., Wolsoncroft, A. E., L.A/C. Lloyd, D.

A THOUSAND BOYS WANTED

The Air Ministry announces that the present expansion of the Royal Air Force affords an opportunity to well-educated boys to enter the service in large numbers. No less than 1,000 boys will be entered for training in the late summer; of these approximately 800 will be required in August for training as aircraft apprentices and the remaining 200 in September as Boy Entrants. No previous trade experience is required by candidates. Applicants for apprenticeships must be at least 15 but under 17 years of age on August 1, 1936, and for Boy Entrants between 15¾ and 17¼ on September 1.

Full particulars of both schemes can be obtained from the Inspector of Recruiting, Royal Air Force, Victory House, Kingsway, London, W.C.2.

The most highly skilled trades (with the highest rates of pay) in the Royal Air Force are open to aircraft apprentices, who are given three years thorough training at a technical school before being posted to units. These trades are fitter, fitter (armourer), wireless operator mechanic, and instrument maker.

The trades open to Boy Entrants are also of great importance and a sound training is given. The pay is good. The trades open are—armourer, photographer, and wireless operator.

A competitive examination for apprenticeships will be conducted at numerous local centres on May 26, 1936, the subjects being English and General Knowledge, Mathematics and Science. The closing date for the receipt of nominations for this examination is Tuesday, May 5. Applicants possessing an approved first school certificate with specified credits may be excused the entrance examination. Candidates sitting at the aircraft apprentice examination for whom apprenticeships are not available may, if of suitable age and educational attainment, be offered enlistment as Boy Entrants. Boys may also be nominated for direct enlistment as Boy Entrants without undergoing the examination. Aircraft apprentices and Boy Entrants are housed, fed, clothed and medically attended free of cost. The training is in the hands of well-qualified technical instructors, and boys entering as apprentices continue their general education throughout the apprenticeship period under a staff of graduate teachers.

FLYING ACCIDENTS

The Air Ministry regrets to announce that Flt. Lt. Harry Hugh Vivian Tristem and A/C.1 Arthur Jesse Clapham lost their lives in an accident which occurred near Khormaksar, Aden, on February 26, to an aircraft of No. 8 (Bomber) Squadron. A second passenger, L.A/C. John Buchan Tainsh, is safe.

It is also announced that Anthony Gill, pilot under training for the Royal Air Force, lost his life as the result of an aircraft accident which occurred at Abbotsinch, Scotland, on February 27.

ROYAL AIR FORCE GAZETTE

London Gazette, February 18 and 25, 1936

General Duties Branch

The following are granted short service commissions as Acting Pilot Officers on probation with effect from February 10 and with seniority of February 3:—A. J. Banham, J. Beavis, W. H. Cliff, P. M. J. Evans, N. G. C. Heath, C. P. V. Hervey, J. G. Kerby, S. H. Kernaghan, E. J. Little, T. N. Partridge, J. W. C. Powell, J. A. Richardson, G. R. Shepley, R. G. Taylor, J. A. Thomson, A. W. T. Traill, D. E. A. Williams.

Sub-Lt. P. E. O'Brien, R.N., is granted a temporary commission as a Flying Officer on attachment to the Royal Air Force (February 12).

The following Flying Officers are promoted to the rank of Flight Lieutenant with effect from the dates stated:—D. M. Lynch-Staunton (January 11); J. A. S. Brown, H. N. G. Ramsbottom-Isherwood (January 12); H. B. Wrigley, W. P. G. Pretty, R. B. Dashper (January 26).

The following Pilot Officers are promoted to the rank of Flying Officer with effect from the dates stated:—R. M. Hall (December 24, 1935); H. Molyneux (January 28).

The permanent commission of Pilot Officer F. W. Thompson is terminated on cessation of duty (February 21); the short service commission of Acting Pilot Officer on probation J. L. Forbes is terminated on cessation of duty (February 14); Lt. P. H. Cardew, R.N., Flying Officer, R.A.F., relinquishes his temporary commission on return to Naval duty (February 17).

Stores Branch

F/O. J. E. V. Tyzack is promoted to the rank of Flight Lieutenant (January 10).

Medical Branch

Flt. Lt. J. Hutchieson, M.B., B.Ch., D.P.H., is promoted to the rank of Squadron Leader (February 24); Wing Cdr. J. Rothwell, M.B., Ch.B., is placed on the retired list at his own request (February 26).

Dental Branch

Flt. Lt. J. E. Willoughby, L.D.S., relinquishes his non-permanent commission on account of ill-health (February 26).

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Sister M. S. U. H. Johnson resigns her appointment (February 25).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

D. S. Jillings, M.C. (Flt. Lt., Hon. Sqn. Ldr., R.A.F., ret.), granted commission as Flight Lieutenant (Hon. Sqn. Ldr.) in Class C, February 1, 1936. F/O. W. H. E. Tew granted hon. rank of Flight Lieutenant while serving with R.A.F. as a civilian assistant ("P" staff duties), December 20, 1935.

F/O. N. W. Wale granted hon. rank of Flight Lieutenant while serving with R.A.F. as a civilian technical officer, January 1, 1936. F/O. J. A. Simpson granted hon. rank of Flight Lieutenant while serving with R.A.F. as civilian assistant (station adjutant), January 6, 1936. Flt. Lt. H. Preston transferred from Class B to Class C, February 5, 1936.

F/O. C. Sagon relinquishes commission on completion of service and permitted to retain rank, October 12, 1935. F/O. K. G. Beauchamp relinquishes commission on appointment to commission in R.A.S.C., February 1, 1936.

G. J. C. Mahony is granted a commission as Flying Officer in Class A (February 6); Flt. Lt. A. E. Dark (R.A.F. Retired) is granted a commission as Flight Lieutenant in Class C (October 1, 1935); Flt. Lt. F. T. McElwee (R.A.F. Retired) is granted a commission as Flight Lieutenant in Class C (January 1); F/O. (Honorary Flt. Lt.) D. G. Fleming (R.A.F. Retired) is granted a commission as Flight Lieutenant in Class C (January 12); F/O. R. J. Copley is granted a commission as Flight Lieutenant in Class C on reappointment (January 6); P/O. G. G. McLannahan is promoted to the rank of Flying Officer (December 5, 1935).

SPECIAL RESERVE

General Duties Branch

F/O. R. A. Hall relinquishes commission on completion of service, December 1, 1935.

Medical Branch

C. W. Kidd granted commission as Flying Officer, January 23, 1936.

AUXILIARY AIR FORCE

General Duties Branch

No. 601 (COUNTY OF LONDON) (FIGHTER) SQUADRON.—W. F. Carnaby is granted a commission as Pilot Officer (January 3).

No. 609 (WEST RIDING) (BOMBER) SQUADRON.—H. Peake is granted a commission as Squadron Leader and appointed to the command of the squadron (February 10).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Squadron Leaders.—Acting Wing Cdr. F. M. F. West, V.C., M.C., to Special Duty List, on appointment as Air Attaché, Helsingfors, 10.2.36. A. M. Wray, M.C., D.F.C., A.F.C., to Headquarters, Fighting Area, Uxbridge; for Armament duties vice Sqn. Ldr. G. V. Howard, D.F.C., 27.1.36.

Flight Lieutenants.—J. E. M. MacCallum, to No. 98 (B) Squadron, Abingdon, 17.2.36. F. H. Shales, to No. 40 (B) Squadron, Abingdon, 17.2.36. E. B. Addison, to Headquarters, R.A.F., Far East Command, Singapore, 9.1.36. W. K. Beisiegel, to D. of T. Dept. of A.M.P., Air Ministry, 24.2.36. B. V. Reynolds, to No. 43 (F) Squadron, Tangmere 24.2.36. E. G. C. Stokes, to Electrical and Wireless School, Cranwell, 24.2.36.

Flying Officers.—G. H. Gatheral, to No. 11 Flying Training School, Wittering, 19.2.36. A. T. D. Sanders, to No. 11 Flying Training School, Wittering, 22.2.36. R. J. Twamley, to Aircraft Depot, Karachi, India, 18.1.36.

Pilot Officers.—C. F. Herington to No. 98 (B) Squadron, Abingdon, 17.2.36. F. W. Flood, G. E. Horn, J. B. Pascoe-Webb, H. D. Newman, V. Roy, G. H. Sheehan, E. A. Whiteley, and N. W. Wright, to R.A.F. Depot, Uxbridge, on appointment to short service commissions with effect from 21.2.36.

Acting Pilot Officers.—K. L. Ashfold, to No. 99 (B) Squadron, Mildenhall, 21.2.36. J. H. Van, to No. 102 (B) Squadron, Worthy Down, 21.2.36.

Stores Branch

Flying Officer.—H. A. Sudbury, to No. 4 Stores Depot, Ruislip, 24.2.36.

Accountant Branch

Flight Lieutenant.—R. J. Wishlade, to R.A.F. Station, Aldergrove, 24.2.36.

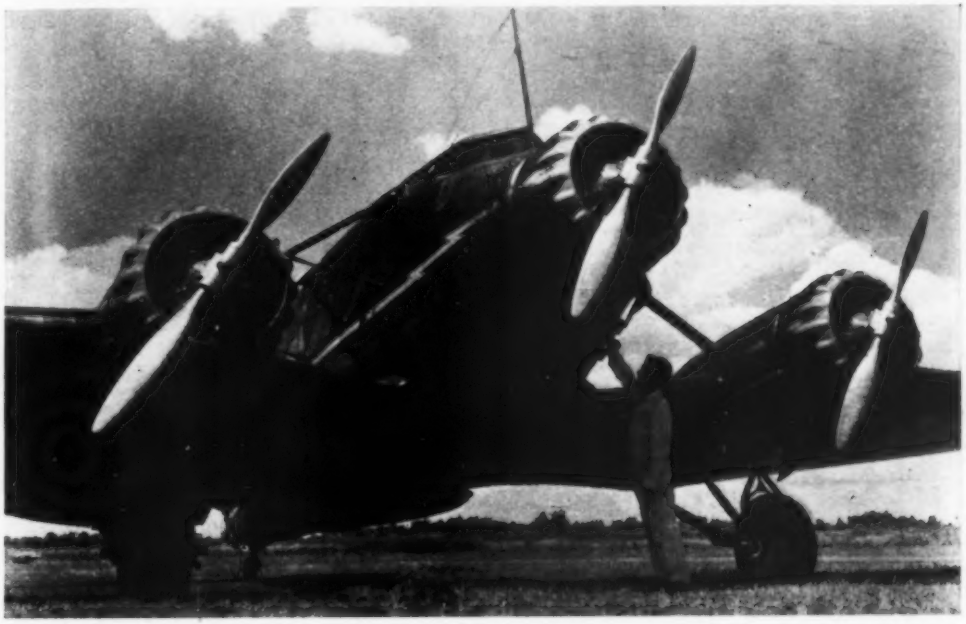
Medical Branch

Squadron Leader.—T. J. N. Canton, to R.A.F. Station, Manston; for duty as Medical Officer, 21.2.36.

Flying Officer.—S. R. C. Nelson, to No. 6 Flying Training School, Netheravon, 21.2.36.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



IN MINIATURE : An imposing view of the Stinson Model A (three 260 h.p. Lycomings) which has been designed specifically for feeder line operation in America. The rights for this machine, which, in its "export" form, has a fixed undercarriage, have been acquired by Brian Allen Aviation, of Croydon. It is possible that we shall see three Stinsons in operation here in the near future.

THE WEEK AT CROYDON

The Blind Approach Line : Seeing Life : The New Imperial Flying-boats : Service Alterations : The Viastra at Work

THE new Croydon blind approach system is progressing faster than most people expected. From the air it looks rather like some sort of birdcage with a small hut alongside, for the wildfowler, decoy duck, or whatever the wizard in charge may be called.

Anyway, I wish the outfit good hunting, and it will be to our great advantage if some of our forlorn wildfowl can be successfully lured out of the air into the cage in foggy weather instead of roosting at odd places up and down the countryside. Actually, of course, there will be no human wizard in the hut. The approach path, I hear, is to be over Purley Way in the gap between the hotel and the adjacent hangars, because this gives the longest run and also, on our bit of undulating downland, the smoothest possible landing. One marker beacon could be somewhere on the tarmac edge, next to the public enclosure, and the other, it has been suggested, might be in the Croydon railway goods yard, which is about the right distance away and on the correct line.

Besides the Imperial pilots who are to be trained in Germany, it is understood that there is a scheme under consideration by British Continental Airways whereby their pilots are to be trained in the Lorenz system as soon as the whole of the company's fleet is fitted. Incidentally, the B.C.A. service to Scandinavia, now in operation, affords an excellent opportunity of daily practical training, since the system is in use at Hamburg. Stockholm, which will eventually be reached, will also have the Lorenz system installed. Mr. J. H. G. McArthur, who was with Mr. Campbell Black on his recent Cape attempt, has just joined B.C.A as a wireless operator. He must be one of the very few members of the Caterpillar Club at Croydon.

Captain "Bill" Ledlie, of Olley Air Service, is one of those lucky people for whom ripe plums fall off the trees just when they feel the need of them, or, if not plums, then ripe and sun-warmed oranges, anyway. When you and I were groping in fog and being advised to fit chains to our car wheels, "Bill" was hard at work following the sun on a special charter job. Leaving Croydon on February 4 he visited Malaga, where he saw a bull fight; Tangiers, where he had a good time; Granada, where he had a look at the original Alhambra; and Seville, where he plucked and ate oranges. The party was given, I understand, by an enlightened lady of sixty-five years, who realises that the best value money can give, during an English winter, is an air cruise of this sort. No sooner had Bill Ledlie returned from this trip than he set off again with another client for a series of business calls in Germany. Charter experts *do* see life!

During the past week interest has been centred round the Imperial flying boats which are being built at Rochester. Pilots of Imperial Airways who will have to fly these boats appear to be happy about them—which is all-important. If I remember correctly, some extremely valuable points were made by Imperial pilots when *Scylla* was being built, and certain last-minute alterations were

Commercial Aviation

made—regarding cockpit visibility, I believe. After all, the man who must live in a house is entitled to point out to the house architect that, in his eagerness for artistic symmetry, he has forgotten the stairs.

Talking of stairs, I hear that in the new boats captains will need to start going aboard a quarter of an hour earlier, since they have to traverse gangways, wander up companionways, and pop through hatchways before marching down corridors and passages to the cockpit, bridge, or engine-room. It all sounds so magnificent that the next step should be a bo's'un to pipe them aboard.

On March 1 several service alterations were made. K.L.M. machines now leave at 8.10 and not 8.20, and the 13.30 departure is cancelled in favour of one at 11.20. D.L.H. now leaves Croydon at 15.00 instead of at 11.30. With the B.C.A. morning service from Croydon, Holland is indeed well served. In summer there will be at least seven services daily to Holland from this airport alone. K.L.M. also announced the reopening of the London-Prague line from March 2, and passengers leaving London to catch the Amsterdam-Batavia machine on the following morning now have the choice of the K.L.M. 11.20 and the D.L.H. 15.00 services.

The passenger lists last week included Mr. Tata, of Tata Sons, Bombay, the firm which operates the well-known mail service, and Miss Cecilia Colledge, who went to Berlin by D.L.H. on Saturday, gave a skating exhibition there on Sunday, and returned on Monday.

Capt. Jimmy Youell has been testing the Vickers Viastra preparatory to blind approach work. This machine, of course, belonged to H.M. the King when Prince of Wales, and it has now been stripped of its beautiful interior decorations, and has become a severely practical member of the working classes.

Air France schedules a new service from March 1 in addition to those already operating. It leaves both Croydon and Le Bourget at 16.00, thus depositing the traveller at his destination in ample time for a cocktail before dinner.

The four Fokker machines bought by Crilly Airways appear to have joined the British Airways fleet, and suddenly found themselves on the London-Paris line.

A. VIATOR.

Norwegian Rationalisation

THE two active Norwegian airline companies, Det Norske Luftfartsselskap and Wideroes Flyveselskap, are contemplating a combine. It is learned that the D.N.L. intends to acquire a controlling block of shares in the W.F.S. At the same time the W.F.S. will increase their stock capital from 150,000 Kroner to 500,000 or 600,000 Kroner in order to maintain new services It is also possible that W.F.S. will take charge of the night-mail service to Gothenburg.

A New Empire Schedule

STARTING with the eastbound service to India and Malaya on March 18, the scheduled dates of departure of Imperial Airways' Empire services from London will be slightly modified. The changes are being made in order to give the best possible service to the greatest number of points along the Empire routes and will result, in many cases, in the saving of from one to three days in the time taken to obtain a reply to a letter.

The eastbound services will, after this date, leave on Wednesday (previously Tuesday) for Egypt, India and Malaya. The Saturday service remains unchanged.

After March 20 the southbound services will leave London every Friday and Tuesday (previously every Wednesday and Sunday). No alteration will be made in the timing.

Incoming Empire services will be unaltered, with the exception that the westbound service from Malaya, India and Egypt will be due to reach London on Thursdays instead of Fridays.

Mass Overhaul

DURING last week the Rollason Aircraft Services' Croydon shops were filled with a more than usually interesting assortment of jobs. Apart from work on the Atalanta wings and on one of the remaining Imperial Wessexes, which is being fitted with dual control for training purposes and is almost finished, there is another Airspeed Ferry in for complete overhaul and both a D.H. Dragon and Rapide owned by British Continental Airways.

The Ferry is like the first, to be used by Scott's circus, and has been lying about in a wet hangar for a very long time—it was originally owned by Midland and Scottish Air Ferries. Ferry Number One is now almost complete and has been fitted with two Gipsy Major outboard engines in place of the original Gipsy II's Such a change has, of course, necessitated quite a lot of detail re-designing, and the result is rather interesting. It would hardly have been thought that the Wessex conversions were worth while (another is being modified by Imperials), since they must have cost a considerable sum, but the only alternative would have been to purchase a couple of twin-engined machines such as D.H. 90s. Since Rollason's spindling machine is the only one available at Croydon it has brought in a lot of good work—including that on the Atalanta wings.

The demonstration Hornet is at present being converted to the 1936 type, with square wing tips, and one D.H. 90 Dragonfly has already been sold by Rollasons.

The Indian National Subsidy

IT appears that the advice of the Standing Committee against the proposed Indian National Airways' subsidy will not, after all, be taken. So Sir James Grigg, the finance member of the Government of India, announced to the Assembly last week.

Australian Duplication

THE Government of Australia has approved the duplication of the Qantas service between Singapore and Brisbane—which means that the air service to Australia will presently be operated twice weekly throughout. Internal connecting services in Australia will also be duplicated in due course.

Twenty of a Kind

THE total order for twenty Potez-62s by Air France will make this twin-engined fourteen-seater one of the most ubiquitous machines on the regular services. The first seven, fitted with Gnome-Rhone K 14s, are on the London-Paris-Lyons-Marseilles-Madrid line—actually only six of these remain, as one was destroyed by a fire at Auxerre last December. The eighth, with Hamilton variable-pitch airscrews and Hispano Suiza 12-XBRS-1 engines, has reached Buenos Aires and will be used on the trans-Andean section of the South American mail service.

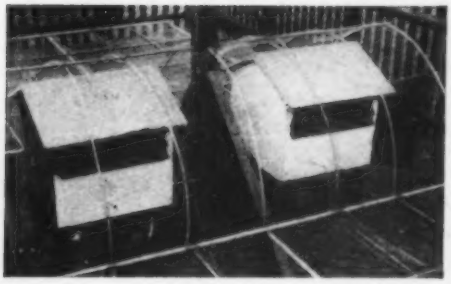
The ninth to the fourteenth (Gnome-Rhone K 14s) are for service on the Far Eastern line between Damascus and Hanoi. The fifteenth to seventeenth (Hispano 12-XBRS-1) will ply between Natal and Buenos Aires. The eighteenth, nineteenth and twentieth (Gnome-Rhone K 14s) will stay in Europe, but the eighteenth will ultimately join the Far Eastern line.

Fogbound

IN spite of the various stories which were told and re-told after the unhappy morning when the Paris newspaper machines were prevented by fog from returning to Croydon and when a K.L.M. machine had to return to Rotterdam, things were not as bad as all that. Mr. J. W. Duggan, knowing that Croydon was likely to be fog-bound, re-fuelled to the limit at Le Bourget, crossed the Channel, and waited near Croydon while the pilot of the K.L.M. machine decided that a landing was impossible.

He continued to wait, but did not receive permission to come in and returned to the coast. Portsmouth and Southampton were weatherbound, and, though Brighton could be seen, Shoreham airport was impossible. He flew along the coast, quite well able to pull off an emergency landing, but hoping that something better would turn up while still carrying plenty of fuel. Lympne was fogbound, but he knew that Littlestone was possible. While making his eventual approach he saw another machine on the aerodrome. The Commercial Air Hire pilot, Mr. Eric Noddings, had also found Littlestone. On the following day Mr. Duggan brought the Dragon back to Croydon with a visibility of 400 yards.

Wrightways have a number of Gipsy engines in for overhaul, and their second Dragon, with the P.B. automatic pilot, should be in service again quite shortly.



HERE IT IS: Various people have, since reading about blind-landing systems, asked us what a marker beacon looks like. Here is one of Heston's, showing the aerial and wire-protected hutches enclosing the transmitting equipment. It will be a wily bird which manages to enter the netting at nesting time.

The Northern Route

IT appears that Pan American Airways, apart from their normal Transatlantic plans, are busy with others for a service from Copenhagen via Iceland and Greenland. D.D.L. (Danish Airways) are interested and may eventually co-operate with P.A.A.

The Irish Service

THE D/F station at Baldonnel aerodrome will be completed early in March, when tests will be carried out. Olley Air Service, who have been given the contract to carry the mails between Dublin and Liverpool, will run experimental services on March 6 and 7.

Things to Come

SOME striking and original designs for airport terminal buildings, with hotel, swimming-bath and hangars, are contained in a reprint, in brochure form, from the *Architect's Journal*. The architecture is the work of Raymond McGrath and Walter Goodesmith.

The principal structural material suggested for the buildings is reinforced concrete, and a generous use would be made of glass. A unique feature of the design is the inclusion, wherever possible (*e.g.*, diving stage, balcony railings, etc.), of electrically welded steel tubing.

A striking scale model of the layout has been made, and it is stated that it will be closely followed in an hotel airport to be erected on a site on the South Coast in the near future.

The brochure, entitled "Design for To-morrow," may be obtained from Tube Products, Ltd., Oldbury, Birmingham, who are specialists in electrically welded steel tubes.

The Real Thing

THREE days after the demonstration of Heston's Lorenz equipment a D.L.H. machine made good use of it in visibility of 400 yards when Herr Steinbeck brought the Ju.52 over again for a private demonstration to Air Ministry officials.

Conditions were so bad that the demonstration was delayed for nearly two hours while two commercial machines were laboriously brought in by normal methods. One circled Heston for thirty-two minutes.

By this time such daylight as could filter through the fog was failing fast, but the demonstration Junkers took the air at 4.34 p.m., carrying as passengers Maj. R. H. S. Mealing, Mr. C. B. Collins and Col. Miles, representing various departments of the Air Ministry, Mr. Samuelson, of Smith's Aircraft Instruments, and Mr. Roderick Denman, who has acted in an advisory capacity in the installation of radio approach guidance at Heston. Group Capt. Primrose witnessed the demonstration from the control tower. The ground was invisible to pilot and passengers before the aeroplane had climbed to 100 feet, but Herr Steinbeck circled and flew straight over the aerodrome on his correct approach track, demonstrating the various aural and visual indications of position, and on the completion of a second wide circuit made a faultless approach and landing.

To Stranraer?

REPRESENTATIVES of Northern and Scottish Airways have been negotiating with the aviation committee of the Stranraer town council with a view to securing land to be utilised for an aerodrome in the district. It is also reported that Stranraer's aviation committee is outlining the advantages of Lochryan, at the head of which Stranraer is situated, as a terminus of a Transatlantic air service. They, however, are not alone in their hopes.

G.E.'s Licences

EXAMINATION boards for ground engineers' licences will be held in London on each Tuesday in April, May and June; at Croydon on the second Friday in April, May and June; in Manchester on the first Friday in June; in Bristol on the first Friday in April; and in Glasgow on the first Thursday in May. Applications for examination at the last three places will only be accepted if these, with the fees, are received twenty-eight days before the specified dates of the various examinations.

Saharan Return

THE Vacuum Oil Company's B.A. Eagle has returned to its permanent quarters at Heston after a 6,000-mile flight from England to Niamey, in West Africa, and back in the hands of Mr. H. J. White. This was a general survey undertaken for the chief purpose of arranging fuel dumps between Aguelock (north of Gao) and Zinder for the new S.A.B.E.N.A. service to the Belgian Congo. No mechanical trouble was experienced, although Saharan surfaces accounted for several burst tyres. Mr. White spent Christmas in mid-Sahara, where he dined upon a muscled fowl purporting to be a chicken. At Niamey he was aroused from sleep by shots in the hotel, where a wild-cat was being put to death in the dining room. This seems to have been the single alarming incident of the flight.

New Zealand's Mail

THE operation of the air mail service from England to New Zealand is proving far from satisfactory. The whole trouble, of course, is that the mail does not go all the way by air and, though it is scheduled to reach Sydney in twelve days from London and seldom arrives more than twenty-four hours behind time, even this delay means that it is four or five days late in New Zealand.

The Qantas machines reach Sydney on Friday mornings and the regular mail boats leave on Friday afternoons. If the connection is missed there is a long wait for another ship. The mail should reach New Zealand in sixteen or seventeen days, but it often takes twenty-three or more days. Sometimes two mails, despatched a week apart, arrive together.

The reorganisation of the Imperial Airways' service in 1937, as well as the projected extension of the air service to the Dominion is strongly favoured by all business men in New Zealand.

STRENGTHENING OUR DEFENCES

Home Aircraft to be Brought Up to Total of 1,750 : Twelve More Squadrons for Overseas : A New Aircraft Carrier : More Army Squadrons

CONSIDERABLE increases in the number of Royal Air Force Squadrons, over and above those laid down in the existing Expansion Scheme, together with re-equipment of the Territorial anti-aircraft defence forces, are specified in the long-awaited White Paper issued by the Government last Tuesday.

After surveying the situation and the growth of foreign armaments, the paper (which is entitled "Statement Relating to Defence") outlines the Government's plans for strengthening British defences. The paragraphs which concern the Royal Air Force and Air Defence are given below.

Paragraph 28 runs as follows:—

A new aircraft carrier, of a smaller type, will be laid down at an early date. The growing naval importance of the Fleet Air Arm will necessitate a considerable expansion of its present strength. Compared with other Navies, such as those of Japan or the United States of America, the number of first-line Fleet Air Arm aircraft is considerably lower than it should be, and it is intended to bring it up to substantially higher figures in the course of the next few years. This increase will, of course, necessitate a corresponding increase in personnel.

In Paragraph 33 it is stated that "The Territorial Army, though generally regarded as the second line in our military forces, actually provides the first line in anti-aircraft and coast defence at home." A beginning is to be made at once in improving this Army's present inadequate equipment and training. In the next paragraph an undertaking is given that the reorganisation of anti-aircraft defences will be extended to cover the important industrial districts in the centre and north of the country.

Royal Air Force Increases

Paragraphs 36 to 43 deal with the Royal Air Force, and we therefore quote them in full:—

The prime function of the Royal Air Force is to provide an effective deterrent to any attack upon the vital interests of this country whether situated at home or overseas. In the present situation this is the most urgent and important of our defence requirements, and it has rightly received the special attention of Parliament

The programme of the Royal Air Force approved by the House of Commons last year was designed to bring up the strength of the Force at home to a total of 123 squadrons with approximately 1,500 first-line aircraft. That programme is proceeding according to plan, but new developments in design will render it possible to make great additions to the striking power of the Force. The latest types of machine which will shortly come into production show such improvements in speed, range and carrying capacity as greatly to increase the operational effectiveness of the squadrons to be equipped with them. Accordingly, the programme already approved will be varied by effecting certain changes in composition and at the same time some addition will be made to the numbers of aircraft. Including four new Auxiliary squadrons to be formed for co-operation with the Territorial Army, the new programme will increase the first-line strength of the Royal Air Force in this country, bringing up the total to approximately 1,750 aircraft, exclusive of the Fleet Air Arm. First-line figures taken by themselves are, however, a misleading criterion of comparative air strengths, as has been explained on many occasions, and in the present case the augmentation of offensive and defensive power which will result from the revised plans of greatly in excess of the numerical increase just mentioned.

The problem of co-ordinated air defence is occupying the constant attention of the Committee of Imperial Defence, with the co-operation of all the Departments concerned. Modern methods of defence and the correlation of offensive and defensive weapons are continually under review, and the scheme has been so drawn up as to ensure the necessary degree of flexibility and the full utilisation of the results obtained from continuous scientific research and experiment.

The Royal Air Force also has responsibilities in the general scheme of Imperial defence. With our wide Imperial responsibilities, the ability to reinforce a threatened area in sufficient time and in sufficient strength demands the location of air units at convenient places on the strategic air routes. The Government propose an increase amounting to approximately twelve squadrons for this purpose.

Mention has already been made of the four new auxiliary squadrons which will form a nucleus for co-operation with the Territorial Army. The five regular squadrons at present allotted for co-operation with the Regular Army will be reorganised to provide seven squadrons, each of twelve aircraft.

Large numbers of young men will be needed as pilots in the Regular Air Force, the Auxiliary Squadrons and the Reserve. Many airmen will be required for enlistment to meet the varied requirements of the Service; and many boys will be needed for apprenticeship in the skilled trades. The available sources of supply will all have to be brought into action, and the full co-operation of the public will be needed for success.

Men and Materials

It is, of course, self-evident that the provision of air forces will not avail in war unless they are given the means not only to fight but to continue fighting. Skilled pilots require time to train, and aircraft production is a lengthy and complicated undertaking. The provision of adequate reserves in both men and material is an essential and urgent need, for without them the war effort of an Air Force could not be sustained.

Particular attention has therefore been given to the provision of these reserves in the shortest possible time, and it can now be said that adequate arrangements for this purpose are in train.

Paragraph 53 runs:—

In connection with the approved programme for the Royal Air Force, steps are already being taken to extend the field of production by placing orders with firms who do not ordinarily manufacture for the Force or for civil aviation.

Dealing further with the organisation of industry, Paragraph 58 runs:—

His Majesty's Government have given much time and thought to this matter and they have been materially aided by the experience gained during the last few months by the Air Ministry working under conditions of exceptional pressure. On the one hand, it is important to retain the goodwill of industry, for in peace time firms cannot be compelled to undertake contracts on terms which they consider unreasonable. On the other hand, difficulties are bound to arise in dealing with so many and such various sources of supply, where there are not only contractors, but also sub-contractors and sub-sub-contractors concerned. There will be new problems where firms require financial assistance in order to lay down new plant and hold it at the Government's disposal, and these cases will be particularly urgent, since until they are met it will not be possible to make a start. It will be necessary also to co-ordinate the demands of the three Services so that proper priority shall be observed and competition between them, which might lead to higher prices, avoided.

Soviet Plans for 1936

THE provisional plans in the U.S.S.R. for 1936 include the opening of 4,400 miles of new air lines, the installation of radio beacons along main routes and the introduction of fast new types.

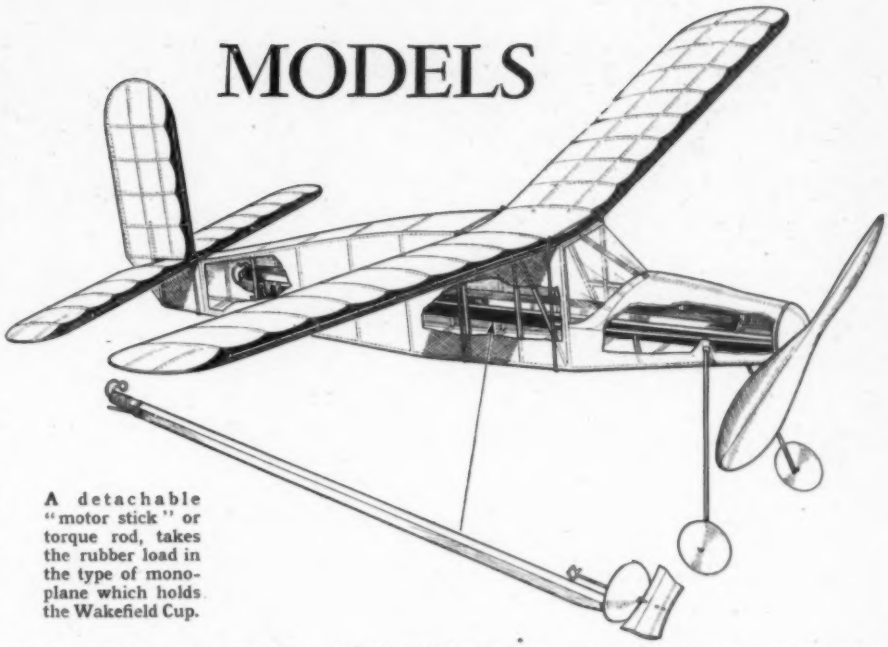
The new routes to be operated this year are between Moscow and Prague, from Moscow through Magnitogorsk to Karaganda (Kazakstan) and a seaplane service from Odessa to Batum.

New machines include the KHAI-I, which, it is reported, has a cruising speed of about 190 m.p.h. Two all-steel machines, the STAL-3 and STAL-11, are also to be put into service. The latter has a top speed of 280 m.p.h. Radio beacons, already in use on the Moscow-Leningrad route and the section across the Caucasus range of the Moscow-Tiflis line, are being installed on the Moscow-Tashkent and Moscow-Vladivostock lines.

MODELS

Interesting Features of the American Design Which Holds the Wakefield Cup : News of Some "Petits Poux"

By M. R. KNIGHT



A detachable "motor stick" or torque rod, takes the rubber load in the type of monoplane which holds the Wakefield Cup.

A "Motor Stick" Model

NOW that interest is centred on the British plans to retrieve the Wakefield Cup from American custody, it is fitting that the model to be described this month should be the one which was responsible for the Cup leaving these shores. The 1935 contest was flown at Fairey's Great West Aerodrome on August 5, and was won for America by Mr. Gordon S. Light's high-wing cabin monoplane. It actually landed on Hanworth Aerodrome, several miles distant, after a flight of about 2 hours 20 minutes, for most of which period it was soaring. Owing to the fact that the rules forbid the time-keepers to move from the launching point or to use binoculars, the winning flight was officially logged as 7½ minutes "out of sight."

The model is typically American in structure and appearance. The wing is mounted very high above the thrust-line, the fuselage being considerably humped to secure this placing. Another distinguishing feature is the following of the American system of using a removable "motor stick," or "torque rod" to take the strain of the rubber motor, instead of allowing it to be borne by the fuselage structure, as is now the British practice. This motor stick is actually a hollow spar constructed of four strips of balsa ⅜ in. × 1/16 in., plugged at intervals to enable it to withstand constant handling. It is permanently coupled to the removable nose-block, both being withdrawn from the fuselage for the purposes of fitting and winding the rubber.

Of 39½ in. span, the one-piece cantilever wing has a constant chord of 5½ in. The dihedral angle is 8 degrees. The lower surface is slightly concave. The eighteen ribs and four spars are of balsa, and the curved wing-tips of 3/32 in. × 3/32 in. bamboo. The covering material is thin Jap tissue, given one coat of clear dope.

The fuselage is circular in section from the nose-block to the wing, being built of 1/32 in. balsa veneer glued around a series of bamboo rings. From the wing leading edge to the sternpost the section is rectangular, with four longerons of ⅛ in. × ⅛ in. balsa. It is covered with Jap tissue, clear doped, with the exception of the cabin, which is covered with cellophane. This cabin idea is utilitarian as well as ornamental, enabling the user to fit the rear end of the motor stick accurately in the securing clip instead of pushing it through the sides of the fuselage. The undercarriage consists of 2 in. balsa wheels, carried by bamboo legs which push into tubes of rolled and glued cartridge paper secured in the fuselage.

Built similarly to the wing, the tail plane has the same concave under-surface. The span is 20 in. and the chord 4 in. The unusual height of the fin is accounted for by the fact that it is identical with one half of the high-aspect-ratio tail plane, the only difference being that the section is symmetrical.

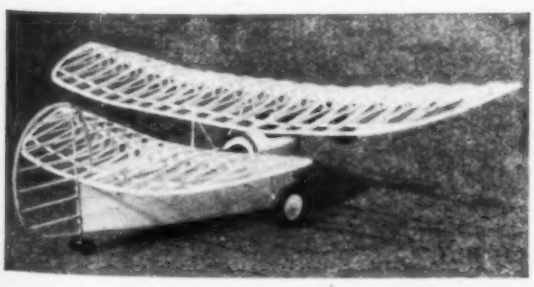
The airscrew is carved from balsa, and the blades are very wide and almost symmetrical in shape. They are rather thin, and are strengthened by having doped Jap tissue glued over the convex side. The diameter is 17 in. The motor consists of twenty strands of ⅛ in. flat rubber. A simple free-wheel device serves to reduce resistance when the model is gliding.

Our sketch is made from a replica of the original model, kindly loaned by Mr. H. York, of Model Aircraft Supplies, Ltd.

Incidentally, the fund (referred to in *Flight* of February 6) for sending a team to America in an endeavour to retrieve the Wakefield Cup has now reached a total of £241 3s., with another £55 13s. promised. Lord Wakefield, it will be remembered, inaugurated the list with a donation of £200. Further contributions, large and small, will be gratefully received by Dr. A. P. Thurston, M.I.M.E., F.R.Ae.S., at Bank Chambers, 329, High Holborn, London, W.C.1.

Three More "Poux"

THE description published in *Flight* of December 12, 1935, of Mr. L. H. Sparey's 30 in. span *Pou-du-Ciel* has brought an interesting letter from Los Angeles. Mr. Kenneth W. Hamilton sends a description of his singularly accurate flying scale model of the Carden-engined Abbott-Baynes *Pou*, which he believes to be the first scale *Pou* to be built and flown in



Two views of a model *Pou-du-Ciel* built by an American enthusiast, Mr. K. W. Hamilton, as described above.

the United States. It is built to a scale of 1 in. to 1 ft., and therefore has a wing span of 22 in. The wings, of balsa, are built up in a manner similar to those of the prototype. They are covered with Jap tissue, and mounted at the best angle of incidence, as found by experiment. The fuselage is constructed of 1/40 in. balsa veneer. The undercarriage is shock-absorbing, and the rudder is adjustable. The airscrew is ungeared, and is powered by six strands of $\frac{1}{8}$ in. flat rubber. The model is fast, has an excellent climb (in contrast to the prototype), and a satisfactory glide. The best duration to date is 20 seconds. Mr. Hamilton made his drawings from photographs and a description of the Abbott-Baynes *Pou*, and refers in appreciative terms to the help and interest he has derived from *Flight*.

In England, Mr. W. Harvey has built a petrol-engined *Pou* model differing only in minor details from M. Mignet's machine. The wing span is about 4 ft., the scale being $\frac{1}{5}$ full size. The weight is $3\frac{1}{2}$ lb. Inclement weather has prevented more than one or two short tests for the purpose of checking trim.

Mr. J. W. Bishop has disposed of his entire fleet of models, including his very successful 30 c.c. petrol-engined biplane *Endeavour*, and on the proceeds is constructing a full-scale *Pou*!

Practical Information

THE 1935-36 edition of Mr. Frank Zaic's *Model Aeronautics Year Book*, a copy of which I have recently received, deals comprehensively with its subject from the American angle of vision. Various writers contribute to its 74 pages. Beginning with a most useful chapter on low-speed aerodynamics, the book goes on to deal with aerofoils, airscrews, determination of fin area, adjustment of models, rubber, the grading of balsa wood, the design, building and towing of gliders, the use of microfilm for wings and airscrews, etc. There are also general arrangement drawings and details of various successful indoor and outdoor models, including the holder of the world's petrol-engined model duration record of 1 hr. 4 min. 40 sec. Model stores can obtain supplies for retail (at 2s. 6d.) from Mr. C. S. Rushbrooke, "Innsbrook," 14, Ennerdale Drive, Ashton-on-Mersey, Sale, Cheshire.

THE INDUSTRY

Putting Them Together Again

THE Airwork service department has been entrusted by Imperial Airways with the manufacture of fuselage and wing replacement wood parts for the Armstrong-Whitworth *Atalanta*-class monoplane and the assembly of metal wing parts for the Handley Page 42. The size of the latter prompted somebody to ask whether it was an aeroplane being built or a new hangar.

From the Right Angle

ARTICULATED-ARM lighting fittings for factories and offices form the subject of a catalogue issued by John Dugdill and Co., Ltd., Hazel Grove, near Stockport.

Lifting Tackle

"PULLEY Blocks and Other Lifting Gear" is the title of a brochure that should be of interest to works engineers. It is issued by Herbert Morris, Ltd., of Loughborough, Leicestershire.

Springs, Assorted

AN extremely comprehensive catalogue of springs of almost every conceivable kind, and also of detail metal fittings, has been issued for the trade by Clarkes (Redditch), Ltd., Sinew Works, Redditch.

The King Examines Aero Fabric

A DOUBTLESS unexpected item of aeronautical interest attracted the attention of the King when he visited the textiles section of the British Industries Fair at the White City, London. It was at the stand of Bessbrook Spinning Co., Ltd., who featured samples of the fabric used in the Miles Falcon in which Flt. Lt. Rose broke the Cape Town record. His Majesty enquired into the process of manufacture and doping, and various points were explained to him by the chairman of the company, Mr. H. Stephens Richardson.

Meeting the Demand

THE appointment of Mr. H. Milnes, late assistant works manager of the Blackburn Aeroplane and Motor Co., Ltd., to the position of works manager of Masson Seeley and Co., Ltd., signifies the culmination of an important re-organisation on the part of the latter firm. Considerable extensions have been made to their engineering works at Somers Place, Upper Tulse Hill, London, S.W.2, and they are now well able to cope with the rapid increase in demand for the production of machined details in light alloys and stainless steels, together with general precision and tool work for the aircraft industry. For the past two years the firm has been engaged in production of this kind for several of the leading aircraft and engine manufacturers.

The sales organisation is under the management of Major F. C. Buck, A.F.R.Ae.S., late of the R.A.F. and R.A.E.

The offices of the company are at Masseeley Building, Howick Place, Westminster, London, S.W.1.

YR-NIC are the appropriate registration letters of an S.T.25 Monospar specially built for the personal use of Prince Nicholas of Roumania. The Prince's pilot, Capt. Nicolai Opris (centre) is see bidding farewell to Mr. L. R. E. H. Castlemaine, of General Aircraft, Ltd., before flying the machine home ; the lady is Capt. Opris' wife.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

DRAGON HIRE LTD.—Private company, registered February 22. Capital £100 in £1 shares. Objects: To operate air lines for passengers, goods or mails, and to carry on the business of aerodrome and air transport service proprietors, aerial and general engineers, etc. The directors are: Richard S. Taylor, 9, Dudley House, Westmorland Street, London, W.1. and Paul Braddon, 22, Gatestone Road, Upper Norwood. Registered office: 4, Field Court, Gray's Inn, W.C.1.

AERONAUTICAL PATENT SPECIFICATIONS

19457. DOWTY, G. H.: Aircraft undercarriages (442,133).
22018. KAY GYROPLANES, LTD., KAY, D., and DYER, J. W.: Aircraft (442,137).
35953. FAIREY AVIATION CO., LTD., and YOUNGMAN, R. T.: Construction of aircraft wings (442,252).
1745. FAIREY AVIATION CO., LTD., and PEARCE, H. L.: Method of covering aircraft components (442,253).
33057. WILKENING, F. W.: Aircraft with a rotating-wing system (442,426).

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